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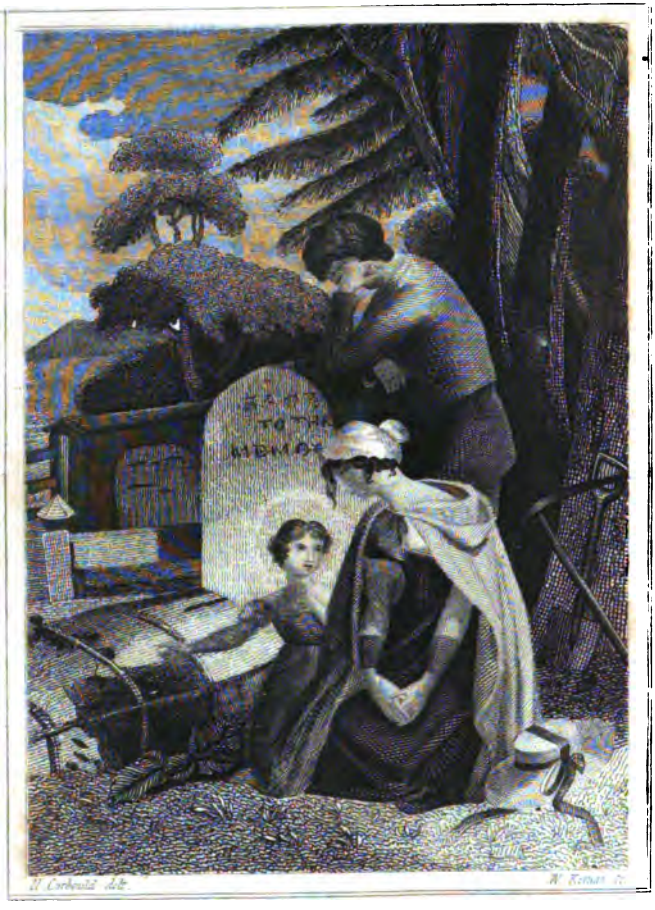

"A simple unornamented grave there,
causes more tears to flow than the gaudy
splendour of a cathedral interment"

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STURMS REFLECTIONS.

Let us walk into some flowery valley
And sing a hymn of praise to our Creator.

July 18.

J. J. WOODWARD

PHILADELPHIA.

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UNIV. OF CALIFORNIA

STURM'S

REFLECTIONS

ON

THE WORKS OF GOD,

AND HIS PROVIDENCE

THROUGHOUT ALL NATURE.

COMPLETE IN ONE VOLUME.

PHILADELPHIA:

PUBLISHED BY J. J. WOODWARD,

No. 7, MINOR STREET.

1838.

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PREFACE.

THE continued and increasing demand for the works of Sturm has occasioned the present edition of his Reflections to be presented to the public; before whose tribunal they have so long been, that to descant now upon their nature, merits, and design, would be superfluous. It may, however, be briefly stated, that these reflections are calculated to enlarge the mind and to purify the heart: they lead the attentive observer through the whole creation, inform him of its stupendous works, and conduct him within the temple of the great God; whilst they inculcate resignation to the divine will, humanity, benevolence, and the most amiable virtues which dignify and adorn human nature.

Several translations of this work have already appeared; but they are all either grossly inaccurate, and deficient in grammatical purity, or they are written in a tame, insipid style, devoid of elegance and destitute of interest. Let it be remembered, that something more than merely expressing the thought is required; the harmony of the cadence, the rounding of the period, and the poising of the sentences, all are necessary to excite and to arrest the attention; and unless the attention be stimulated and stabilitated, it will be to very little purpose that the moralist declaims, or the philosopher writes. For purposes merely didactic, when something is to be told that was not known before, a style the most naked and beggarly might, perhaps, be endured; because the novelty of the matter may induce us to overlook the poverty of the manner: not but, even in this case, the thought will receive additional strength and lustre from elegance and splendour of diction; as a beautiful woman appears more lovely when arrayed with neatness and simplicity, than when cloaked to the heels in very rags and tatters.

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But against that inattention by which known truths are suffered to be neglected, insipid language or sterility of imagery makes no provision; it may, perchance, instruct, but can never persuade. Now, although what Sturm says is very good, and very just, yet, as he wishes to lead us from the error of our ways to the wisdom of the just, it is necessary that he use every effort to impress upon our minds an earnest desire to follow him in his strains of piety and heavenly contemplations. He has many powerful obstacles to struggle against; such as, the obstinate resistance of our own perverted and corrupt hearts, and the allurements and example of an ignorant and embrutified world, which will not listen to the voice of the charmer, charm he never so wisely.

We well know that the same truth, told in two different ways, shall have a very different effect upon our minds: let it be doled out to us in a droning, drowsy tone, and in homely, vulgar language, and we either sleep, or turn our backs upon the speaker; but let a man deliver this truth in appropriate diction, with impressive seriousness and awful solemnity, and it will penetrate to the inmost recesses of our heart. The same reasoning applies to writing; which may, indeed, be called speaking to the eye. We slumber over the page which is polluted by colloquial barbarisms, and deformed by continual outrages against accuracy and elegance. In such a situation is the invaluable Sturm placed by his translators: his thoughts are clouded by unseemly language, and buried by a tiresome abundance of repetitions. I do not mean to blame them for not having been sufficiently literal in their versions; because the idioms of the two languages are so different, that all the spirit of the original must vanish if the copy be made too close. The attempting to render word for word any work from one language into another, is a foolish and useless undertaking; because it precludes the possibility of expressing the sense of the author. It will be readily seen, therefore, that I do not mean to give a literal, but a liberal translation of Sturm: his repetitions of the same things, and many such there are, I have avoided; some of his inaccuracies ventured to correct, and have omitted some trifling passages, which lessened the weight and dignity of the subject; and every where, by an attention to style, have endeavoured to give it the spirit of an original work. In doing this I have been anxious to preserve the same fervent strain of piety which animated the worthy author; and in presenting this work to the public in a more elegant dress and convenient form, I am not conscious of having at all per-

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verted the spirit of the original, or derogated from the dignity of the subject. This edition, although translated by the same hand as that *erroneously* said to be by the *Author* of the *Adviser*, differs in some respects from that translation, which was composed very hastily, and came from the press with some inaccuracies. Some of the concluding sentences, which were omitted before, are now restored, as tending to promote the cause of religion and the practice of humanity; and many corrections have been made.

I cannot conclude, without sincerely congratulating the public upon the increase of piety, and the more general diffusion of knowledge, in this country. Our children are leaving the worse-than-foolish tales of Tom Thumb, Goody Two-shoes, Little Red Riding-hood, Jack the Giant Killer, and many more productions of like nature, all tending to vitiate their young minds, fill them with absurd notions, and encourage a love of the marvellous, and a dislike to plain truth; for works savouring more of probability, and tending to conduct them through the paths of virtue to the temple of fame. The present work I venture to recommend to young people, with a firm confidence in its improving the mind and ameliorating the heart. It will be particularly useful to those whose reading is not very extensive, as containing much useful information in natural history and natural philosophy, conveyed in language intelligible to young children; and every where abounding with devotion warm from the heart.

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REFLECTIONS

UPON

THE WORKS OF GOD,

AS DISPLAYED IN NATURE.

JANUARY I.

A MEDITATION UPON NEW-YEAR'S DAY.

LET us consider this day as the first of our lives, and venture to anticipate, from the goodness of God, a repetition of those benefits which we have received from our first entrance into the world, to the present period of our existence. What blessings may we hope from that Being, which has ever watched over us with the tender solicitude of a father; which, at the hour of our birth, presented us in our parents with friends that have supplied all our wants, and supported us through the helpless and unprotected state of infancy? Without their fostering care, how could we have preserved our health, and all the comforts which we now enjoy? Were it possible for us at that time to have reflected upon our destined fate, we should doubtless have looked forward with delight to the pleasures of our sublunary existence; now that we are capable of such reflections, it is pleasing to indulge the sensations our present happiness inspires, and our imagination dwells with rapture upon the sweet hopes of future felicity.

To-day a new career of life opens before us, in which, though more advanced to maturity, we still require a portion of that support we experienced, when, feeble and destitute, we first drew our breath. In the hour of danger, and in the time of affliction, we feel the necessity of a friend to support us, and of a companion to cheer our drooping spirits, who can smooth life's rugged path, and heighten all her pleasures. And surely our Heavenly Father has already chosen for us such a friend; one who, when doubt and uncertainty perplex, will advise us how to act, and when misfortune threatens, will be our chief support and consolation; who, during the full tide of prosperity, will partake of our joys, and who will assist our reasoning faculties when enfeebled and enervated.

It was not by accident, or without design, that we came into the world. As a part of the great system of nature, our destiny is over

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ruled by an all-seeing Providence, of whose designs respecting us we are ignorant, but who knows all, and governs all with wisdom and harmony; and whatever unknown disasters impend, or unexpected benefits await us, this present year, let us bow down with reverence and with gratitude to his divine will. Whatsoever be our lot, whether to endure the chilling blasts of penury, or to suffer the heart-rending anguish of a once dear friend forgetting the ties of affection, let us strengthen our belief in the all-protecting arm of God. Though dangers may threaten, and persecution afflict, we will yet look up to that Almighty Power which raised our feeble frame to its present state of hardihood, which cherished the tender bud from all the storms and perils that frowned upon its expansion; we will believe that He, who thus protected our infancy, will not be less the father and the supporter of our old age.

JANUARY II.

WINTER HAS BLESSINGS, WHICH ARE OFTEN DISREGARDED.

If we examine the works of God with attention, we shall find, even in this season, many subjects which may lead us to rejoice in the goodness of the Lord, and to exalt the miracles of his wisdom. During the budding spring, the bountiful summer, and the luxuriant autumn, when Nature, from the most simple, assumes her gayest and most splendid robes, hardened and callous, indeed, must be that heart which does not throb with pleasure, and pulsate with gratitude, for such choice gifts. But when the north wind blows, when a biting frost stiffens the face of the earth, when the fields, stripped of their fruits, and divested of all their charms, present one wild and desolating view, then it is that men of the greatest sensibility will sometimes forget to be grateful. But is it true that the earth at this season is so utterly destitute of the blessings of Heaven, that it possesses nothing that can excite the emotions of gratitude and of piety in the heart of man? Certainly not. Let us only bestow more attention upon the works of nature, and we shall never find occasion to arraign the wisdom of God.

Reflect for a moment upon the misery of being exposed to the rigours of winter, with no clothes to defend your shivering frame, no fire to cheer and to animate your benumbed body; and then rejoice and be grateful for the favours you receive. You have every thing that can contribute to your comfort. Though you cannot penetrate through the veil which overshadows the creation, though the great First Cause of all things be hidden from your view, rest assured, that nothing is created in vain: all tends to one grand point, the glory of God, and the happiness of man.

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JANUARY III.

GOD CONTINUALLY PRESIDES OVER HIS CREATION.

Not to acknowledge the greatness and wisdom of God in the least of his works, as well as in great and extraordinary phenomena, betrays alike our ignorance and our weakness. The formation and evolution of the child in the mother's womb displays as much the power of God, as did the creation of the first man from the dust of the earth. Our own individual experience is sufficient to convince us, that a Supreme Being suspends the thread of our destiny. We cannot ensure for ourselves another moment's existence; a thousand unseen causes may hasten the period of its termination; what unknown evils may not be impending to stop the vital current, and forbid the pure air again to renovate our blood!

Every man may say, Alas! I feel my helpless state; I have no power to remove the infirmities that afflict me, nor ability to disperse the dangers that threaten; subject to a heavy train of bodily diseases, and mental imbecility, I feel that, without the support of the Almighty, I should indeed be miserable. The wonderful connexion between my soul and my body, the continual pulsation of my heart, the constant secretion and circulation of various fluids in my body, all depending neither upon my will nor my power, contribute to assure me there is a great and powerful Being, at whose command these functions proceed with order and regularity, or stop, and my present existence ceases. If my breast still continues to heave, if the ruddy stream still warms my heart, if my muscles act with vigour, my senses remain preserved, it is from God alone I derive such choice blessings. Why, then, do I so seldom think, with gratitude, upon the ways of Providence?

Ought not the reflections now presented ever to be deeply graven on the tablets of memory; and should it not be our morning and our evening care to muse upon, to admire, and to hail with gratitude, the blessings of our Creator?

JANUARY IV.

USES AND ADVANTAGES OF FIRE.

Fire is a very universal agent in perfecting the arts, and contributing to the comforts of life; and we find the principles of it are diffused throughout nature in water as well as in air, and in all oleaginous substances. How useful to man are those combustible matters which supply him with fuel, and without a sufficiency of which he must suffer the greatest inconvenience, and lose incalculable advantages. Were it not for the fire which cheers us in winter, a great

portion of our time must be passed in dreary darkness: without artificial light all our occupations and our amusements must cease with the departing sun; we should be obliged to remain at rest, or to wander with uncertainty and danger in midnight gloom. Consider how melancholy our lot must be, had we been obliged to pass the long evenings of winter without the enjoyments of society, and those superior sources of pleasures and instruction derived from reading and writing. How many of the productions of the earth would be useless to us were they not softened and prepared by means of fire! If fire was not had recourse to by artists, how many necessities would be unprovided for, and of what benefits should we not be deprived! Without this element we should not be able to give to our garments the brilliancy of the scarlet, nor the richness of the purple; our metals, incapable of being melted, would remain useless in the depths of the earth; glass could not be formed from the sand; the beautiful utensils now in common use could not have been fashioned from the yielding clay; nor could our stately edifices rear their tops among the clouds, and bid defiance to the elements. Without fire, in vain would nature teem with riches; all her treasures would be useless, and her charms of no avail.

But we have no necessity to traverse nature to prove the blessing of fire! Let us return from our flight, and contemplate our own apartment. Here, the fire diffuses a genial warmth through the whole room, and the air is rendered mild. Without the stimulating influence of fire, during the strong frosts, we should become inactive, and subject to many unpleasant sensations; the aged and the weak would perish: and what would become of the little infant, if the chilly blasts were not tempered to its delicate limbs? Oh! unfortunate poor! ye who, with scarcely bread to support your miserable existence, are at this severe season obliged to deprive yourselves of a portion of that pittance to procure fuel to warm your shivering body; how I feel for your wants! how my heart bleeds for your distressed condition! But your hard lot recalls to my mind the great favours I have received from Heaven, for which I am not sufficiently grateful. I feel the obligation I am under to a gracious God; who, I pray, as he has given me the means, will open my heart to relieve those afflictions in others from which I myself am exempt. O God, my Creator and Benefactor, condescend still to look down upon me! Behold, my heart swells with praises and thanksgivings to thee my Et rnal Parent, the Author of all the comforts which I now enjoy. Continue to grant me the benign influence of fire; and may this element never become the instrument of vengeance to me or my brethren!

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JANUARY V.

AMUSEMENTS OF WINTER.

During this season, which many people imagine possesses few charms, each individual following his inclination endeavours to find amusements to enliven the long winter evenings. Many pursue one continual round of riot and dissipation. It is indeed truly lamentable to see so many people, by indolence, or frivolous pursuits, contriving to lose the days already too short. The course of the day is commonly filled with a circle of occupations, which neither correspond to the dignity of man, nor the destination of his soul. Late in the morning the voluptuary rises from his bed; during breakfast he plans out the amusements of the day; then abandoning himself to every species of idleness, awaits the hour of dinner; which arrived, he gives himself up to the pleasures of the table. Gorged with excess, he throws himself upon a couch to recruit his exhausted powers. The hour comes when he is to meet a numerous party. He sits down to play. For the first time since the sun-beams irradiated the east, he appears to possess a soul: with cards in his hand the hours fly rapidly. At length this sensual wretch quits his cards for another debauch, and reels from table to bed; but sleep does not gently overpower his senses, and wrap his soul in sweet forgetfulness. Pain and watching oppress him, or frightful dreams disturb his troubled slumbers.

How ingenious is man in devising trifling amusements to abridge the few moments allotted him! Sometimes the pleasures of the chase call him from his home, that he may enjoy the gratification of seeing the timid hare, and the panting deer, fly with the speed of wind to escape their cruel pursuers; or that he may have the satisfaction of viewing them in their last sad agonies, torn and mangled, and hear their piercing cries, mingled with the savage howl of dogs and men, reverberated from the neighbouring hills.

The ball allures with meretricious charms; and there innocence of heart is often exchanged for sorrow and disease. At one time feasts invite, at another diversions and public places; all tending to mislead and corrupt. Having enumerated a sufficient specimen of the amusements of winter, let me conclude by reminding my fellow-creatures of the part they ought to act respecting such diversions. I wish not to discourage and repress that inclination for social intercourse which, particularly at this season of the year, is highly delightful; but I wish you not to suffer it to take such firm hold of your mind as to become a passion. Allowing that when you meet together nothing passes that can derogate from virtue and good manners, yet such parties may be hurtful by consuming too much of your time, and occasioning the neglect of your domestic economy. Pleasure is not the business of our lives; the power of obtaining it is granted us by a beneficent God, to serve for a relaxation from the severer duties of

business or study. To be too eager in the pursuit of pleasure is at the risk of never obtaining your end, or of acquiring that which may ultimately produce sorrow and remorse. Be very careful, then, with what society you mix; lavish not your time in those amusements which you cannot enjoy without injuring your virtue, your reputation, or the peace of your family. Let not those heedless pleasures that disturb your neighbours, excite their lamentations, and fill them with sorrow, and by which you may be lost to the duties of society and of religion, ever find access to your heart. Suffer not even the most innocent gratifications to render you insensible to the pure and permanent pleasures of Christianity, or to make you dissatisfied with your more serious occupations.

Oh God! govern with thy gracious influence our hearts; and grant that amidst earthly enjoyments we may never forget thy most holy name. That in our intercourse with men, the remembrance of thy presence may secure us from temptations, and that from day to day we may become more and more devoted to the exercise of our duties as Christians, parents, and citizens; whilst we shun those fleeting pleasures which so easily allure us from the path of rectitude, and diminish our zeal for good works. What inducement can we have to seek for frivolous amusements, when we possess within ourselves the sources of the most pure and refined pleasures? The contemplation of the great works of nature at all times is grand, and fills the mind with wonder and reverence for the Creator. In winter, as well as in the other seasons, they shine forth equally manifest. The starry heavens, the fields, far as the eye can reach, covered with snow, inspire the noblest and most sublime ideas, create a constant succession of pleasure, and elevate and dignify the soul.

JANUARY VI.

GOD'S PROVIDENTIAL CARE OF THE ANIMAL CREATION DURING WINTER.

Millions of rational beings, dispersed among the various nations of the earth, are provided at this season with every thing necessary to supply their wants, or add to their comforts. But Divine goodness is not extended to man alone, it is diffused over the whole creation; and infinitely more numerous than the children of Adam are the animated beings partaking of it. Admirable as is the preservation of the human species, God gives still greater proofs of his wisdom and power in the care which he manifests for the brute creation. That the innumerable tribes of animals existing on this globe find, during the continuance of summer, food and shelter, is not surprising; all nature teeming with fertility conduces to this great end; but that in this season of the year such numbers of creatures—birds, quadrupeds, reptiles, insects, and fishes—should continue to exist, must demand

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the admiration of every reflecting being. Nature has provided most animals with a covering to defend them from the winter's cold, as well as from the summer's heat. Those wild animals which dwell amid the forest and the desert are so admirably organized, that their hair, as summer advances, begins to fall from their skin, and grows again in winter with such luxuriance as to become a thick fur, capable of preserving them from the severity of the season.

When cold renders a place of security requisite, other species of animals find retreats; some under the bark of trees, others in the crevices of old buildings, and some within the clefts of rocks, and in the caverns of mountains. It is there they either live upon the food which instinct has taught them to provide, or they are nourished and supported by the fat which they had previously secreted, or they pass the tedious length of winter in a state of torpescent insensibility, each according to the habits of its tribe. Birds at the approach of winter retire to sheltered places; and some species possess an instinct, which leads them at the commencement of cold to quit the frozen regions of the north, winging their bold and arduous flight for more genial climes.

The resources of those animals which do not change their abode in winter are various. Birds feed upon the insects which they are taught to peck among the moss and in the clefts of the bark of trees; many animals live upon the provisions they have providently stored in their dens during the summer, others are obliged to burrow beneath the ice and the snow to find support. Many species of insects and of fishes, though confined within marshes stiff by the frost, and in rivers whose surfaces are frozen, yet preserve their vitality.

Let us then unite in adoration to the all-powerful and merciful Creator, whose majesty and whose grandeur cover all the creatures of the earth; all of which, from the stately elephant to the most feeble and minute animal under the heavens, owe to him their life, their abode, and their support. Where nature seems barren and destitute of resources, he still finds means to make her productive. Let these considerations strengthen our confidence in God, and banish from our minds all doubts of the continuance of his protection and support during the rigours of winter.

That God who provides a covering for animals, who points out to them secure retreats in the caves of the mountains, will also know how to clothe thee, O man! And he who supplies them with food and with warmth, even beneath the ice and the snow, will ever be thy support, and thou wilt find a sure harbour, where thy days may glide in peace and in tranquillity, safe from storms and commotions. Let such reflections as these raise in thy bosom a desire to imitate, as far as thy abilities permit, the generous cares of Divine Providence, by contributing to the preservation and happiness of thy fellow-creatures, and of the whole animal creation.

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JANUARY VII.

THE BEAUTIES OF THE WINTER.

Every season has its peculiar pleasures and beauties; and however destitute of charms winter may appear to some people, it has still a portion to interest the feelings. For the benefit of those who, from prejudice and ignorance, murmur and repine against this season, I will here enumerate some of the particular pleasures which it offers us.

How delightful is the face of nature when the morning light first dawns upon a country embosomed in snow? The thick mist which obscured the earth, and concealed every object from our view, at once vanishes. How beautiful are the tops of the trees, hoary with frost? The hills and the valleys, reflecting the sun-beams, assume various tints: all nature is animated by the genial influence of the bright luminary, which now invites the warbling songsters from the groves to make jocund the day with their harmonious notes. If nature, during the absence of the sun, droops and is overspread with gloom, when the horizon is again illumined with cheering rays she resumes her wonted gaiety, and, robed in white, delights the traveller with her novel and delicate appearance. How beautiful to see the white hills, the forests, and the groves all sparkling! What a delightful combination these objects present! Observe the brilliancy of those hedges! See the lofty trees bending beneath their dazzling burden! The surface of the earth appears one vast plain mantled in white and splendid array.

Little, indeed, are the feelings of those to be envied upon whom these grand phenomena make no impression; beings who can contemplate with indifference a spectacle which ought to gladden their hearts and fill their souls with the majesty of Heaven, and the boundless wisdom, and immeasurable goodness of an all-powerful God. Such reflections, arising from the contemplation of his works, always produce satisfaction and delight. The heavens may lower, the agitation of the air portend a storm, and nature, losing her sweetest attractions, appear bleak, wild, and desolate; yet the soul, retiring within itself, derives energy and an exalted pleasure in tracing, by his works, the power, the wisdom, and the benignity of the God head.

JANUARY VIII.

OF THE VEGETABLES WHICH PRESERVE THEIR VERDURE THROUGH THE WINTER.

At this season of the year the earth, losing the variety of charms which so lately beautified her surface, seems solitary and destitute;

and may be compared to a tender mother, who has been bereft of her dearest children, and is seen to mourn and lament. But she is not deprived of all her offspring; here and there plants are seen to brave the rigours of winter, and by their verdure relieve the sterility of the scene. Here the hawthorn's tempting berries offer the feathered race a sweet repast; the ever-verdant laurustinus now delights with its clustering flowers; and the never-fading yew-tree forms a dark shade. The creeping ivy still winds around the mouldering battlements, and defies the whistling wind and the storm's loud roar; the laurel blooms with verdure undiminished; and the lowly box looks green above the snow. These, with many other plants, preserve their verdant hue amid every severity of season and rigour of climate. They may present a pleasing emblem of the ever-durable advantages he possesses, whose mind is amply stored, and whose amiable disposition makes all around him smile with joy and pleasure. The splendour of dress, and the profusions of ornaments, which dazzle and fascinate the weak and the vulgar, are vain and transitory; colours, that vie with the rainbow in brilliancy, fade; the pride of youth, beauty smiling with every grace and symmetry of form, flutter awhile amid the sun-beams, and are seen no more; but the charms of virtue last for ever. The man who fears God, 'resembles a tree, which, planted on the banks of a rivulet, as it grows to maturity expands, and stretches forth its branches far round with unfading verdure, and produces its fruits in season; it offers an ever-refreshing shade, and the weary traveller blesses it.'

How amiable is the truly pious man! His ornaments are within, and his virtue shines forth with beauty unborrowed of the external and adventitious smiles of fortune. The storms of adversity may shake, but can never overpower him; though for a moment cast down, his bold front soon towers above the tempest. If misfortune darkens his horizon, and poverty frowns, he is still blessed with riches that wealth cannot purchase—the love of God, a good conscience, and the bright hope of a glorious immortality.

This reflection leads me to the idea of a benevolent old man, who in the winter of his life resembles those plants which at that season still preserve their verdure. How many storms of fortune has he not braved with constancy! How many dear attracting objects have withered in his sight! He yet exists, whilst many of his contemporaries are mingled with the silent dust. A mild cheerfulness still plays on his cheeks. Though his forehead be wrinkled, and the strong hand of time mark his venerable countenance, and render feeble his frame, his virtues recompense his lost vigour, he lives again in his offspring, and his wisdom, his integrity, and his experience, are held up as a noble example to his children's children.

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JANUARY IX.

SINGULAR STATE OF MAN DURING THE TIME OF SLEEP.

We need not have recourse to extraordinary events to be convinced of the inconceivable power and wisdom of God; we have only to look around us. He shines conspicuously in the least of his works. Of the many remarkable things of which he is the author, I wish to call your attention to one, which, because it daily occurs, is not the less deserving of your observation. Often as you have been refreshed by sleep, perhaps you have never reflected upon this singular state, nor regarded it as one of the most extraordinary effects of Divine goodness. When sleep overpowers us with a pleasing forgetfulness, we do not think it wonderful; we believe our body is formed for such a state, and that the inclination, prompting us to indulge in sleep, proceeds from natural causes. But perhaps we may with propriety consider sleep under two points of view. On the one hand, there is nothing to be observed which may not result from the peculiar nature of our organization; on the other, there is something so striking and wonderful in this natural effect, that any labour bestowed upon the consideration of it will be amply compensated.

Sleep comes upon us imperceptibly; if we endeavour to ascertain the exact moment, the attention we give will be an obstacle to its approach; nor shall we be able to sleep till all such ideas are dissipated. Sleep comes unsolicited; the more efforts we make to obtain it, the less likely are we to succeed. God has so appointed sleep, that it becomes an agreeable necessity; and he has rendered it independent of our reason and of our will. Let us pursue this consideration, and muse upon the wonderful state we are in during sleep. We live without being conscious of our existence. The functions all act with their wonted regularity. The activity of the soul, for a space, seems to be suspended; the senses are benumbed, the muscles inactive, and all voluntary motion ceases. In short, the state of sleep is truly wonderful, and very much resembles that of death: who can think of sleep without being at the same time reminded of death; which, sooner or later, will imperceptibly steal upon us, or seize us without warning, unwished for and unexpected?

The senses, whose functions are suspended during sleep, are equally incapable of action at the near approach of death. The ideas also are clouded; we notice not surrounding objects, and a dark oblivion veils our faculties. Let devotion often present this meditation to our minds. Whenever we seek for repose upon the downy pillow, let us reflect upon the blessings of sleep, and look up with gratitude to Him, who during our seclusion from toil and labour, watches over our slumbers, and preserves from dangers our helpless condition. For, if a protecting hand did not shield us, to how many perils might we not be subjected during the night-season!

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JANUARY X.

OF THE ADVANTAGES OF OUR CLIMATE.

Have we a proper sense of the great happiness which we enjoy in so many respects? The blessings of our Heavenly Father are every where poured out upon us. The view of ample forests, of the rising hills, and the extended meadows; the pure and temperate breezes we inhale, the seasons, with their accompanying variations, and different attractions, all denote the unspeakable beneficence of God, and his wish for the happiness of man. How then can we ever complain of the hardness of our condition, accuse the Almighty of a partial distribution of his favours, or murmur because the summer declines, and the rays of the sun do not for ever beam upon our soil, nor an equal degree of warmth cheer the inhabitants of our zone? What ingratitude, and what ignorance! We know not what we desire, nor of what we complain. Seeing that God has peculiarly favoured our climate, is it through pride or inadvertency that we acknowledge not his goodness? We often repine at the rigours of winter, and envy those who know no vicissitude of season; but let us remember, that what we most dread, the keen air of winter, perhaps, renders our climate the most salubrious of any on the globe. Observe the languid, exhausted frame of the inhabitants beneath a cloudless sun, the diseases that prey upon them, and the indolence which they are of necessity obliged to endure. When even the cold in our climate is felt most severely, we may comfort ourselves that this, compared with the cold of more northerly countries, is no more than the temperature of autumn. How different is our lot from that of the shivering natives near the north pole! Here, even in winter, the friendly rays of the sun enliven the days, and incite universal gaiety. There, the day, dreary as the night, receives no light from the sun. Here, in perfect security, whether reposing in our beds, or indulging over the blazing hearth, we defy the rigours of the season; the charms of society soften its asperities, and the constant succession of day and night cheers and revives; but in those frozen regions, the miserable huts form a poor shelter from the pitiless pelting of the storm, and the wild savages of the woods and the deserts keep the starved inhabitants in a state of constant alarm and danger, by the loudness of their roar, and the frequency of their wild horrific cry; and with them a perpetual winter reigns. Whilst we, after a few stormy months, are visited by a season whose charms console us for all that we have suffered, and amid the joy and harmony inspired by a vernal sun, we forget the name of winter. Let us, then, bless the beneficent hand which has assigned us so happy an inheritance; let us glorify God, who has regulated our present allotment with so much wisdom and goodness; and let us joyfully render thanks unto Him who has fixed our abode in a climate, where, in each succeeding season, his bounty is displayed with magnificence, and diffused with abundance, throughout the creation.

JANUARY XI.

SNOW CONDUCES TO THE EARTH'S FERTILITY.

Regarding appearances only, we might be induced to say, that snow, so far from being useful to the earth, was by its cold and moisture of detriment to trees and plants. But the experience of centuries teaches us, that to preserve grain, plants, and vegetables, from the effects of cold, nature can give no better protection than by shielding them with snow, which, though seemingly cold, yet shelters the earth's surface from freezing winds, and preserves a due degree of heat for the preservation of seeds.

Thus God provides what is necessary for the support and nutriment of the works of his creation. Nature is always active, even when she appears in a state of perfect quiescence, and renders us real services at the time she appears most to deny them. Observe the providence of God exerted for our good in the roughest season, and preparing, without any assistance on our part, all the treasures of nature. With such proofs of Divine protection, who can doubt or mistrust? The wonders that God performs in nature every winter, he also daily effects for the preservation of mankind. What at first often appears useless or prejudicial, ultimately contributes to our felicity; and often when we imagine that God has ceased to interest himself in our welfare, he is, perhaps, completing a part of his glorious scheme, impenetrable to our view, but which unfolding, may be the means of delivering us from some impending calamity, or procure us some benefit beyond the flight of hope to aspire after. Snow, however, is not merely destined as a covering to the earth, it tends also to assist its fertility, by penetrating beneath the surface, and supplying a proper degree of moisture.

'As the rain cometh down, and the snow from heaven, and returneth not thither again, but watereth the earth, and maketh it bring forth and bud, that it may give seed to the sower, and bread to the eater; so shall my word be that goeth forth out of my mouth; it shall not return unto me void, but it shall accomplish that which I please, and it shall prosper in the thing whereto I sent it.'—Isaiah lv. 10, 11.

We live in an age in which this prediction, through the mouth of the prophet, is accomplished in a remarkable manner. Whole provinces and kingdoms, which formerly, shrouded in the gloom of ignorance, of superstition, and of credulity, were oppressed by slavery, and deluded by the dreams of idolatry, in this glorious day of gospel dispensation, cheered by the blessed light from heaven, have emerged from darkness and obscurity, have aroused their slumbering faculties, and have embraced the great truths of Christianity. Over how many obdurate hearts has it triumphed! How many good works, how many blessed fruits of piety, has it brought to maturity! May the Divine grace be so poured into our hearts, that we may ever feel its quickening, saving influence!

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JANUARY XII.

CONTEMPLATION OF THE HEAVENLY BODIES.

The heavens present to our view, in the night season, a scene of grandeur and sublimity, which forcibly impresses the attentive observer of nature. But how few are capable of receiving the great and noble ideas which the contemplation of the firmament calls forth in a philosophic mind! How few even observe it at all! This, I imagine, can only proceed from ignorance; for it is impossible to take an extensive range through nature, and view the majestic objects every where presented, without at once being led through nature up to nature's God, and feeling the power of the mind expand in our vast flight through the regions of space, till we are lost in admiration and rapture, and feel a celestial radiance illume our souls. Oh that every human being would partake of this Divine pleasure! that they would elevate their thoughts beyond the confines of earth, and ranging above the spheres, repose on heaven! It is enough merely to name those immense bodies, each in itself a world revolving in space, to fill the mind with awe and astonishment at the mighty power of the Creator.

In the centre of the planetary system, the Sun, more than a million times larger than our earth, and at the distance of 82 millions of miles, rolls his majestic orb, round which revolve seven planets with their attendant satellites, all deriving their lustre from the central luminary. These planets are known to the astronomers by the names of Saturn, Jupiter, Mars, Venus, the Earth, Mercury, and Herschel.* Of these, the nearest to the sun is Mercury; it is much smaller than the earth, its diameter being only 2600 miles, and from its proximity to the sun, round which it performs its course in eighty-eight days, rolling at the rate of 95,000 miles an hour, is seldom visible to our eye: the light and heat it derives from the sun are nearly seven times as great as ours, being distant from that luminary only 32 millions of miles. Next comes Venus, completing her revolution round the sun in about seven months, at the computed distance of 59 millions of miles; she is larger than our earth, and shines when west of the sun as a morning star, and when east as an evening star, with astonishing splendour, moving hourly in her orbit 69,000 miles. The third circle is the orbit of the Earth, revolving round the sun at the rate of 51,000 miles an hour, which though little more than half as swift as the motion of Mercury in his orbit, is one hundred and twenty times swifter than that of a cannon-ball. The Earth's diameter is 7970 miles, and the moon rolls round it as an attendant satellite, performing her course in 29 days, 12 hours, and 44 minutes. The moon's diameter is 2180 miles, and her distance from the Earth's centre, 240,000. The planet next in order is Mars, about 125 millions

* Discovered first at Bath, March 17, 1781, by the philosopher whose name it bears.

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of miles distant from the sun, and travelling round him in 686 days and 23 hours, at the rate of 47 millions of miles every hour. The diameter of Mars is 4444 miles, his quantity of light and heat equal but to half of ours, and the sun appears to him but half as large as to us. The fifth and the largest of all the planets, is Jupiter, distant from the sun 486 millions of miles, and going every hour in his orbit 25,000 miles. He finishes his annual period in 11 of our years, 314 days, and 12 hours. He is above one thousand times larger than our earth, and is surrounded by faint substances called belts; they vary considerably in appearance, and sometimes disappear altogether; hence they have been supposed to be clouds. Four moons revolve round the planet Jupiter, so that scarcely any part of his immense orb remains unenlightened, except the poles, whence only the farthest moons can be seen; but light is there least required, because the sun constantly circulates in or near the horizon, and may be kept in view of both poles by the refraction of Jupiter's atmosphere. Saturn is about 780 millions of miles distant from the sun, and travelling at the rate of 18,000 miles every hour, performs his annual circuit in 29 years, 167 days, and five hours of our time. He is nearly six hundred times larger than our earth, his diameter being 67,000 miles: and he is surrounded by a broad ring, round the outer circumference of which revolves five attendant moons.* The sun shines on one side of Saturn's ring for nearly fifteen years without setting, and as long on the other in its turn. The last known planet in our system is Herschel, distant from the sun about 1565 millions of miles, and performing his annual circuit in 83 years, 140 days, and 8 hours of our time, at the rate of 7000 miles an hour. His diameter being 34,000 miles, he is about eighty times larger than our earth. Dr. Herschel has discovered six attendant moons, and supposes there may be more.

Such is the stupendous grandeur of the planetary system; yet the sun, with all his accompanying planets, forms but a very small part of the universe. Each star, which to us appears scarcely larger or more brilliant than the diamond, equals the sun in magnitude and in splendour, and is in itself a world, and the centre of a planetary system. That they shine with their own and not a borrowed light is demonstrable by their immense distance from the sun, which renders it impossible for them to be illumined by his rays: a cannon-ball shot off from the sun would not reach the nearest fixed star in 600,000 years; hence each may be considered as a sun: and he who imagines that such glorious luminaries were formed to shine with an ineffectual light, can have but a very contracted idea of the Almighty power and wisdom. The number of stars in either hemisphere visible to the naked eye is not more than a thousand; with the assistance of a good telescope three thousand may be perceived, and, could better instruments be procured, there is every probability of thousands more existing;

* Dr. Herschel has discovered two other moons belonging to Saturn, so that there are now seven moons attendant on that planet.

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nay, some very profound philosophers have supposed there are stars at such inconceivable distances, that their light has not yet reached the earth since its creation, although the velocity, with which light passes, is a million times greater than that of a cannon-ball. Thus, though a man may measure the universe with his telescope, he can form only a very inadequate idea of its amazing extent.

What a noble, what an august subject for meditation! Though the mind of man cannot yet bear to soar with the steady flight of the eagle through the boundless regions of space; though he cannot yet grasp within his span the sublime view of orb encircling orb, each in itself a luminary, multiplied without end, attended by millions of worlds, all revolving in matchless order, and harmonious regularity, each in his silent course, with varied motion; some whirling with a rapidity our senses cannot conceive, others less distant performing their circles with less velocity; and all these worlds containing myriads of intelligent beings in different states of felicity and perfectibility.

If then the utmost stretch of the human faculties, the utmost vigour of our reason, cannot comprehend the totality of these works, nor our imagination expand even beyond our own system, how can we pretend to scan that Almighty Being, at whose word order arose out of confusion, chaos was converted into elements, and the starry spheres began to move through the heavens.*

JANUARY XIII.

DISCOVERIES WHICH HAVE BEEN MADE BY THE MICROSCOPE.

The wonders of nature are displayed in the minutest as well as in the largest objects; whether we consider the structure of the mite, or that of the towering elephant, we shall find her alike excellent: she has formed them both with the same degree of propriety of construction. It is our senses which are not sufficiently acute to perceive the organization of very small bodies, which often escape our observation, unless we have recourse to foreign assistance. The microscope has opened to us a new world of insects and vegetables; it has shown us, that objects, invisible to the naked eye, exist, having figure, extension, and different parts: some examples of which we shall produce, that we may have more causes to admire and praise the wisdom of God. Every grain of sand, when examined by the naked eye appears round, but with the help of a glass we observe each grain differs from the other, both in size and in figure: some of them are perfectly round, others square, some conical, and the major part of an irregular form.

* As the above account differs from the original more than even a liberal translation will authorize, it is right to state, that considerable errors were found, and had been continued by the preceding translators; to correct which in the present edition, the works of Newton, of Ferguson, and of Euler, have been consulted.—E.

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What is still more astonishing, by microscopes, which magnify objects millions of times more than their natural size, we can discover, in the grains of sand, a new animal world; for within their cavities dwell various insects. In cheese are found innumerable animalculæ, called mites, which to the naked eye appear as points, whilst, seen through a microscope, they are found to be insects of a very singular form and structure; they have not only a mouth, eyes, and feet, but their transparent body is covered with long hairs, sharp, and formed like needles.* In the vegetable kingdom we are presented with a thick forest of trees and plants, bearing leaves, branches, flowers, and fruits; the rudiments of all which beautiful objects were once hidden beneath the mould: little as we should have expected to find these in such a bed, as little should we have supposed the dust upon the wings of a butterfly to be minute feathers, or the bloom of a peach to be a collection of insects, had not the microscope furnished us with this intelligence.

Thus we see the power of God is great in those things which ignorance makes us regard as minute; for however small the minutest animalcule appears to us, we have reason to believe there are objects which appear to it as small as it does to us. By the view which we have just been taking, we shall also find the subjects of nature to be much more numerous than we had imagined. Though we are acquainted with many thousand species of plants and insects, how many more are there yet hidden from our researches! If we could explore the vast abyss of the sea, or search the bottom of rivers, penetrate within the numerous forests, at present the haunt of savages and reptiles, what additions should we not make to our present limited collection, and find new causes to admire the wonderful works of God!

JANUARY XIV.

ADVANTAGES OF NIGHT.

When the sun hath withdrawn his friendly light from us, and darkness has obscured the face of nature, we are doubtless deprived of some pleasures. Nevertheless, we have no cause to complain of this arrangement. As the mixture of pleasure and pain, the alternation of good and evil, are wisely ordered; so also we must acknowledge the wisdom and goodness of God in the remarkable variation which is observed in our climate: and we must allow that the seeming in-

* The view of a frog through a solar microscope is strikingly beautiful; from the transparency of its skin, the blood is seen to circulate in the vessels in a manner indescribably wonderful and brilliant. The physiologist is likewise indebted to the microscope for his more intimate knowledge of the red particles of the blood; but, owing to a difference of glasses, or some imperfection in the optic nerve, there is yet a dispute whether they are perfectly globular, or circular as to circumference with a plane superficies, in the manner of a flat shilling.—E.

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conveniences of the winter nights are compensated by a thousand advantages. Without an occasional privation of sunshine, should we be so well convinced of its great comfort and utility?

Let each returning night recall to our minds the goodness of God, who, for the benefit of mankind, has diffused light and beauty over the face of the earth; let us reflect upon our miserable condition, if each succeeding morn did not ensure the continuance of light. Is not darkness itself, at certain intervals, pleasing, by inviting us to repose and tranquillity under the sweet influence of sleep? How many labourers consume their days and exhaust their strength in toiling for our services, whose work is often attended with disagreeable and painful sensations; to these night is welcome, and they hail the approaching evening with joy, when, free from the unrelenting frowns of a hard master, or the cries of their feeble and helpless children, they may sink down to rest, and enjoy a sweet oblivion of their cares.

When night has spread her sable mantle over the earth, all the little bubbles which so agitated man during the day cease to disturb him; all his emotions of envy, of jealousy, of pride, and of malignity, yield to the drowsy influence; all his sorrows, his doubts, and his perplexities, for a time, are suspended; stretched on his couch, he only wishes for sleep; his eyelids once safely sealed, the monarch, encanopied with purple, is no more than the beggar nestling in his straw.

What then do we not owe to the Supreme Being who thus has provided for the good of his creatures; who has appointed a time when the weary shall rest, and the oppressed shall be relieved; when millions of human beings, condemned by necessity to drag on a wretched existence, employed in hard tasks and painful toils, or who groan beneath the yoke of slavery, have their allotted hour of ease and freedom; in which their cares and their sorrows may sink into soft repose; when the weary traveller shall lie down, and the exhausted peasant gain new vigour and recruited force; and when the philosopher shall be obliged to cease from the intense thinking which would destroy his powers, that he may rise and pursue his investigations with redoubled energy?

JANUARY XV.

REFLECTIONS UPON SELF.

It is reasonable that every man should sometimes withdraw his attention from foreign objects, and fix it upon himself. By continually thinking of the things which surround us, we are apt to lose sight of ourselves, and forget the gratitude which the contemplation of the starry heavens, and the enjoyment of the blessings showered down upon the earth, ought to excite in our bosoms. To be convinced that man is as excellent an example of the perfection of God's

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divine power and wisdom, as are those objects which by their grandeur astonish the faculties, I wish that every individual would deeply reflect upon all that most intimately concerns his structure. How admirable is the union of the body and the soul! How incomprehensible their action? We daily experience that when the rays of light, reflected from external objects, strike upon the retina, the mind receives an idea of the size, figure, and colour of such objects. We find certain vibratory undulations of the atmospherical air convey to the mind, through the medium of the ear, an idea of sound. By this power of perception we obtain the knowledge of all the changes which occur in surrounding bodies, as well as an acquaintance with the thoughts of other men. We find whenever a desire for motion from place to place arises in our minds, the body obeys the impulse; and whether the trunk, the head, or the limbs, are required to move, obedience follows the will. These are facts well known and daily experienced, but it is beyond the power of man to explain them.

In this reciprocal influence of the soul upon the body, and the body upon the soul, there is a wisdom displayed which we cannot search into, and the result of our profoundest investigations into this exquisite union of body and soul must be admiration and astonishment.

If we consider the body separately, we find it every where displays the power of the creating Hand; each limb is ordered in the most convenient manner for utility as well as beauty; no change that man can devise will be of benefit to him, so admirably is the human frame organized—so wisely is it constituted. Its internal arrangement is still more wonderful. The body has different ends to answer, different functions to perform; it is the medium through which the soul receives cognizance of external objects. For this great purpose we find it furnished with the organs of sight, of hearing, of taste, of feeling, and of smell, each in itself worthy the highest admiration. But to enable the body to transmit to the soul the sensations of external objects, it is necessary motion should be readily performed, for which purpose we find various parts provided by nature: the bones, muscles, joints, ligaments, and cellular substance, all exquisitely arranged, give the power of moving in every direction: but a machine like this, in frequent motion, must be liable to a continual waste; to supply which loss, and keep it in proper order, it will be necessary to receive aliment, to comminute it, to separate its nutritious juices, to circulate them through the whole machine with such proportion and regularity that each part may receive the quantity necessary for its due support; for all which purposes suitable functions are provided.

We have reason then to praise the Lord, who has thus wonderfully formed us, all of whose works are so admirable. To thee, O God! be rendered all adoration and thanksgiving. Let us celebrate thy praise with the sound of the harp, and with the song of joy and of gladness. We are the prodigies of thy power; all our faculties and our senses display thy Divine wisdom. May we ever be permitted to glorify and exalt thy holy name; and may we, when time here shall be to us no more, rejoice in thy goodness, through a blessed eternity!

JANUARY XVI.

THE DAMAGE OCCASIONED BY EXTRAORDINARY COLD.

Why do we so readily notice those effects of nature which seem to be injurious? Why do we so willingly dwell upon and even murmur at them, whilst we slightly pass over all the striking advantages which they procure us? Men in such cases act towards God as they are accustomed to do with their fellow-creatures. A trifling offence, a slight injury they may have received from their best friend or benefactor, often effaces from their memory the essential benefits they have received; their pride and their ingratitude cause them to overlook the benefits, while they magnify the injury. At this season of the year we have a memorable instance of their disposition: men seem only to regard the evil which may result from the cold, and never consider the good it may produce. If they discover the least injury, if some part of the great whole suffer, they think themselves authorised to murmur against God, without at all considering that nature, taken as a whole, deduces great advantages from the cold. If we weigh with impartiality the advantages and the evils which may be attributed to it, the result will convince us how little cause we have to arraign the government of the Almighty.

It is true, a severe season causes many inconveniences, and induces some distressing consequences. Sometimes the water is frozen to such a depth that it is not possible to obtain a supply of this necessary article; the fish die in the ponds; rivers swelling above their banks, their torrents increased by the melting snow, and containing vast masses of floating ice, burst their boundaries and devastate the neighbouring country. The working of water-mills is stopped; vegetables suffer; wood and fuel entirely fail, or become excessively enhanced in price; grain, potatoes, &c. if not well covered, are spoiled, and plants and trees die. Many animals perish from cold and hunger, and the health and safety of man are often endangered.

These are some of the most striking evils which the rigour of a severe season may produce; but how many winters do we not pass without witnessing such a degree of extreme severity! Admitting, however, that these disastrous effects oftener occurred, what right have we to complain, when the advantages much more than compensate for any evils we may endure? Knowing so little of the great chain of causes which links together this world, how are we poor finite beings to pronounce and decide upon what is best for nature, or upon what is most prejudicial to her? Let us not then expose our ignorance and absurdity, by blaming or condemning the laws of nature, because we see but a very minute part, and are totally incapable of grasping the whole. Let us rather acknowledge our incapacity, and acquire a confidence in the ways of Providence which shall induce us to believe and to feel assured, that He who has created the heavens and the earth has likewise ordained a portion of happiness and of

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good sufficient for our present condition, and far exceeding all the accumulated evils we can possibly endure. With this reliance upon the Rock of ages, we shall remain firm and unmoved, amid the warring of elements and the general wreck of nature; whilst we ascribe praise, honour, and thanksgiving, to our wise and beneficent Creator.

JANUARY XVII.

NATURE REPOSES DURING THE WINTER.

The days of winter are the days of nature's rest. In the preceding months she has been exhausted with incessant labour for the good of man. How rich has the spring been in flowers; how the seeds have expanded and the foliage sprouted! What abundance of fruits the summer prepares for the autumn's maturing hand! Every month, every day, we receive some fresh gift from nature. As the tender mother provides for her young with anxious care, so nature is busied from morning to evening in supplying our wants, and in procuring us a succession of comforts and blessings to make life's fleeting moments smile with joy and with delight. Food, raiment, and the chief sources of our pleasures, are all derived from her fostering bosom. For us she makes the seeds to open and expand, the herbs to bud, the trees to look gay with foliage, beautiful with blossoms, and to pour forth their riches in fruit of every kind that can please the eye or gratify the taste. For us, the golden grain waves over the fields, the vine offers her varied treasures, and the whole creation is clothed in verdure, and presents to the delighted observer an infinitely varied and beautiful field of attractions. Wearied by so many labours, nature, for a space, reposes, in order to acquire new force, that she may again be equally fruitful, and again be enabled to assume her wonted resplendency.

Here also, O beneficent Creator! I adore thy wisdom. The repose of nature in winter is not less interesting to us, nor less worthy of entering into the plan of thy Divine Providence, than her utmost activity in spring and summer. Thou hast prepared the different revolutions of the earth; thou hast established the most intimate relation between them; and with an impartial hand hast distributed labour and rest. It is Thou who hast willed that each sun should vary the seasons of nature, in such times and ways as are most fit for the perfection of the whole. If I have ever been foolish enough to blame any thing in the government of the world, O God! pardon my temerity. I now see, and am fully persuaded, that all the arrangements of thy Providence, however extraordinary they may appear to my feeble intellects, are full of wisdom and goodness. Now, that I see the earth mantled with a deep snow, I think of the good which will result from it, and bless the wisdom of God; for I now know that unless nature, at certain intervals, enjoyed a state of rest, we should

no longer see the flowers and the fruits which so beautify the creation and increase the comforts of life; no more would the joyful harvest-home gladden the swain, nor the fields exchange their dusky hue for the sprightly green.

There is a time also when the labours, the cares, and the vexations of man shall cease, when his sorrows shall be no more. In the spring and summer of life, the greatest activity and exertions are necessary to secure a comfortable existence for ourselves, and to contribute all in our power to the good of our fellow-creatures. The autumn will soon arrive; and may we resemble the luxuriant trees which shed into our lap their ripe and mature fruits! may we be enabled from our own fulness to give to others a portion of our treasures, and make the rich stores of our minds flow into those who have not equal opportunities of acquiring knowledge! so that in the winter of our age, when the measure of our days shall be filled, and our head silvered over with time, it may be said, as we pass along, See that venerable man, who has devoted his youth to the benefit of mankind, whose days have been passed in the continued exertion of his faculties, and in the constant pursuit of active good, he is hastening to receive the reward of his good actions in the eternal kingdom of peace, of joy, and of felicity!

JANUARY XVIII.

OF THE LAPLANDERS.

It is my desire to begin this meditation with a lively sense of gratitude to my Creator, and of compassion for those of my fellow-creatures to whom nature has been less bountiful in her gifts. I shall confine my attention in this day's reflection to the Laplanders, and to the natives of those countries which border upon the arctic circle; a race of people whose lot, compared with ours, seems to be much less happy. Their country is almost entirely formed of mountains, perpetually capped with snow and ice, the continued chain of which is only interrupted by vast marshes. Winter reigns during the greatest part of the year; the nights are long, and the days have but a feeble light. According to the season, the inhabitants live in houses or in tents. In winter they seek shelter from the cold in their houses, which have neither door nor chimney; the fire is in the centre, and the smoke escapes through a vaulted aperture in front, by which they enter the house, being from the lowness of the passage obliged to creep upon their hands and feet; the roof of the house is covered with furs, and the walls within are lined with the same materials: they also sleep and sit down upon the skins of animals. During six months of the year they are enveloped in the shades of night, and, confined to their houses, hear nothing around them but the whistling of the wind, the roaring of the tempest, and the fierce howling of

the wolves, driven by hunger to prowl for their prey near the habitations of man.

How thankful ought we to be that we do not live in such a climate, where, far as the eye can reach, extends one vast chain of icy mountains and immense deserts, covered with snow! where the cold is intense, the habitations miserable, and no means of subsistence but such as are offered by the dangerous and toilsome chase can be obtained! where we should be deprived of all the pleasures and comforts procured by the arts, and all the charms and blessings of a cultivated society! Let us then feel and know the value of our own climate, and glorify God, who has made our condition so much superior, and distinguished us with such numerous advantages. Yet the hardy inhabitant of these northern regions is not the unfortunate being we may suppose. It is true that he wanders exposed to every inclemency of sky, through a dreary and rugged country; that he is poor, and deprived of many of life's choicest blessings; and that for months together he is never cheered by the sun-beams. But his frame is strong and capable of enduring much fatigue, his wants are few, education and habit inure him to the rigours of the clime, and the gloom of his long nights is rendered supportable by the moon and frequent glimmering of the aurora borealis. The Laplander is extremely agile, and glides over the snow, upon skates, with a velocity which frequently outstrips the fleet deer: in these expeditions, a stranger to fear, he will scale the hills or fly down the precipice. The rein-deer is subservient to his use, and yoked to the sledge this swift animal will draw him over immense tracts of country; and when worn out with age or fatigue, his skin supplies clothing and furniture.

In the beginning of the spring, when the melting snow penetrates their humble roofs, these people quit their houses to pass the summer in tents, which they find more convenient for their mode of living; these they make as comfortable as possible, and smile at the accounts of travellers who attempt to persuade them it is possible to enjoy greater happiness than they experience in what we call their miserable situation. They are hospitable, and lovers of peace; but prone to revenge, and extremely superstitious: they have their feasts and their entertainments, with different diversions; and were the rays of knowledge and of a pure religion ever to irradiate their minds; their idle dreams of witches, of spirits, and of hobgoblins; their belief in magic and in charms; to be dissipated by the torch of truth, they might, indeed, since happiness is not confined to any particular country, be a happy and an independent race of men.

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JANUARY XIX.

WISDOM DISPLAYED IN THE STRUCTURE OF THE GLOBE.

However limited the human capacity may be, and confined the understanding; and though we are unable to comprehend the great plan of the universe, we may yet, through the medium of our senses, and by the exertion of those faculties which we all enjoy, discover enough to know and to admire the wisdom of God. To be convinced of this we have only to consider the figure of the earth, which we shall find to be that of a sphere, a form the best adapted for its surface, to be every where inhabited by living creatures. This end could not have been accomplished if the inhabitants of the earth did not experience a sufficient degree of light and heat; if water could not, in every part, circulate without impediment; and if the winds were not suffered to blow unretarded by obstacles. For all these purposes the rotundity of the earth is admirably adapted; it is owing to this that the light and heat are so readily diffused throughout the globe. Were it not for this form, the succession of night and day, the different changes of the temperature of the air, of cold, of heat, of moisture, and of dryness, could not have occurred.

If we consider the immense body of the earth, and its excellent degree of consistence, neither too hard nor too soft, we have still more cause to admire the Supreme wisdom. Was it more hard, more compact, and less penetrable, it would be incapable of being converted to the purposes of agriculture, and we should not enjoy the plants, the herbs, the roots, and the flowers, which now beautify its surface, and are nourished within its fostering bosom. The earth is formed of different strata, consisting of fossils, bituminous and calcareous matters, metals, and minerals; the water which we drink and convert to so many useful purposes is rendered limpid by filtrating through beds of sand at a great depth within the earth; the mountains and the valleys, the plains and the hills, which diversify its surface, whilst they contribute by their beauty to the pleasure of man, promote his health, as well as the salubrity of the various species of plants and animals which exist in every situation of the earth.

Who is there that will not acknowledge that the whole plan of the earth, its form, its exterior and interior structure, are all regulated by the wisest laws, and all tending to promote and to increase the happiness of animated beings? Wherever we direct our attention, whether to examine the beautiful and grand objects diffused over the face of nature, or whether to penetrate within the interior of the earth, we perceive that every thing is arranged with wisdom, and we every where discover the legible characters and broad stamp of an Infinite, Almighty, and Supreme Being.

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JANUARY XX.

SHORT MEDITATIONS UPON THE WORKS OF GOD, TAKEN FROM THE SCRIPTURES.

'Hearken unto this, stand still, and consider the wonderful works of God.'*

'Jehovah hath formed the earth by his power; he hath established the earth by his wisdom, and hath stretched out the heavens by his understanding.'†

'And God said, Let there be light, and there was light; and God saw the light that it was good; and God separated the light from the darkness, and he called the light day, and the darkness he called night.'‡

'Thou art the Lord who hast made the heavens and the heaven of heavens, with all their hosts; the earth, and all things therein; the seas, and all that is therein: thou givest life to all things, and the hosts of heaven worship thee.'§

'O Lord, my God! thou art marvellously great; thou art clothed with honour and majesty! Who coverest thyself with light as with a garment: who stretchest out the heavens as a curtain. The Lord layeth the beams of his chambers in the waters, he maketh the clouds his chariot; he walketh upon the wings of the wind: he maketh the winds his messengers, and the lightnings his agents. He hath laid the foundations of the earth so that they cannot be shaken. He hath covered it with the deep as with a garment; the waters stood above the mountains, but at his rebuke they fled; at the voice of his thunder they hasted away.'‖

'He has stretched out the heavens over the chaos, and hath hung the earth upon nothing. He bindeth up the waters in his thick clouds, and the cloud is not rent under them. His power raiseth the waves of the sea, and his wisdom restraineth their fury.¶ He raiseth the vapours, and assembleth them in clouds, which pour down in rain upon the face of the earth. He covereth the heavens with dark clouds, and the thunderbolts issue from his tabernacle. He darts his lightnings through the thick clouds, where all the waters of the sea seem to be collected. Thence, as from his throne, he pronounceth judgment upon the nations, or scattereth abundance over the face of the earth.'**

'The thunder peals, and we see the lightnings flash; God announceth his wonders, and performeth things too marvellous for our comprehension. He sayeth unto the rain of winter, Fall down upon the earth; and it inundates the countries. Out of the south cometh the whirlwind, and cold out of the north. By the breath of God ice is produced, and the waters which were spread on all sides are held in chains. He causeth the most clear and serene sky to succeed to that

* Job xxxvii. 14. † Jer. x. 12. ‡ Gen. i. 3—5. § Neh. ix. 6.
‖ Ps. civ. 1, 7. ¶ Job xxvi. 7—12. ** Job xxxvi. 27, &c.

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which was most obscured; and his light dispels the clouds.* He who holds the reins of the world, collects these meteors, that they may fulfil the task which he hath appointed them on the face of the earth; whether he intends that they should punish men, or manifest the effects of his bounty.

'God is wise in heart, and mighty in strength: who hath opposed him and hath prospered? He snatcheth up the mountains, and overturneth them with the breath of his nostrils. He shaketh the earth out of her place, and the pillars thereof tremble. He commandeth the sun, and it riseth not; and he sealeth up the stars. He spreadeth out the heavens alone, and walketh upon the waves of the sea. He hath formed the constellations Arcturus, Orion, and Pleiades, and the chambers of the south.'†

'Thou hast opened the fountain and the torrent; thou hast dried up the mighty rivers. The day is thine; the night also is thine: thou hast prepared the light and the sun. Thou hast set all the borders of the earth; thou hast made summer and winter.‡ He raiseth up the east wind in the air, and sendeth forth the south wind by his power.'§

'He watereth the mountains from his chambers; the earth is satisfied with the fruit of his works. He causeth the grass to grow for the cattle, and grain for the service of man, that he may bring forth fruit out of the earth.'‖ 'For thus saith the Lord that created the heaven: God himself that formed the earth and made it, and hath established it, created it not in vain; he formed it to be inhabited. I am the Lord, and there is none else.'¶

JANUARY XXI.

OF THE HUMAN VOICE.

The human voice, both in its principles, its variations, and its organs, is certainly most admirable, and its nature difficult to be explained. Let us first consider the organs by which we are enabled to emit sounds. The air is received into the lungs through a tube called the trachea or windpipe; this is chiefly formed of cartilages nearly circular, united by an elastic membrane. The entrance from the mouth is singularly formed, so as to admit the passage of air into and from the lungs; but as the smallest particle of food getting into the trachea would be productive of the worst consequences, a valve is placed over the mouth of the tube, which is shut whilst we eat or drink, and only opens to admit the passage of air.** The air being then expelled through this tube into the larynx with a certain degree

* Job xxxvii. 5, &c. † Job ix. 4. 9. ‡ Ps. lxxiv. 15—17.
§ Ps. lxviii. 26. ‖ Ps. civ. 13, 14. ¶ Isa. xlv. 18.

** This valve is called the epiglottis, and the orifice over which it is placed, the glottis: there are, besides, cartilages called thyroid, two arytænoid, and the cryeoid, all together constituting the larynx, which is the part most essential to the voice.—E.

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of force, and thence into the mouth, occasions the voice, which is formed when the air is quickly expelled through the contracted glottis into the larynx, from which the sound arises. The particular formation, and the different degrees of contraction and motion of the larynx, glottis, &c. and the manner in which the air is expelled through their parts, principally conduce to occasion the great variety of sounds and difference of voice we meet with.*

Speech consists in the pronunciation of letters, which are of two kinds: those which are pronounced without the tongue moving against any part of the mouth, are called vowels; those which require collision of the tongue with some other part of the mouth, lips, and teeth, are consonants. The communication between the nostrils and the mouth, much facilitates our pronunciation; hence when this channel is obstructed we experience a great change of voice.

Having thus generally considered the parts necessary to the formation of the voice, let us reflect a little upon its beauties and advantages. By the means of the voice we have been enabled to become a civilized people, and have obtained all the blessings peculiar to that state. We find when it pleased God to confound the impious builders of Babel, he had only to render their language unintelligible to each other, and the work could not proceed. Consider it in all its consequences with regard to society, and it will be found that, without the means of rendering ourselves understood by our companions, social intercourse must cease. Besides, there is something so fascinating in some of the modulations of the voice, that they penetrate our souls, and we acknowledge their influence from the bottom of our heart. A pleasing and soft voice, tuned to the language it utters, is irresistible; and we often, from the tone of the voice, judge of the temper of the mind. Let us then, since experience teaches us this pleasing gift may be improved by attention, spare no pains in its cultivation, and offer up our thanks to the Almighty for bestowing upon us a treasure, without which, life would not be desirable; a treasure which by our own exertions we can make still more estimable: and may we never be found amongst the number of those who misapply this heavenly gift, but ever convert it to the benefit and pleasure of our fellow-creatures!

* The author divides the trachea into four equal parts, which he says, produce the twelve full tones that he asserts the human voice is possessed of; these he subdivides into one hundred more, and hence sets down that a man may produce 2400 different tones of voice, which may all be distinguished by the ear. To say nothing of the very little we yet know respecting the tones of the human voice; which, however, we have reason to believe, if accurately investigated, would be found to be very few, though susceptible of infinite variation; I have only to observe, that so far from the trachea producing these tones, it may be divided, or wounded, without the voice suffering, whilst the slightest injury done to the larynx will materially affect the voice.—E.

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JANUARY XXII.

NECESSITY OF REFLECTING UPON GOD.

I address myself to those who seek with laudable solicitude, to derive edification from every occurrence. I wish to induce you, by regarding the different changes of nature at this season, to be led to reflect upon the wonders of God, whose glory shines now equally manifest as at every other time. Whilst you behold the earth covered with snow, rivers arrested in their course by the frost, the trees stripped of their foliage, and all nature wild and desolate, think of the reasons which alone can influence Providence in this change, which you will find to be for the benefit of the whole creation. If, from the contraction of your mind, the narrow limits of your faculties, you can scarcely comprehend the smallest part of the designs of God, let it satisfy you to know that the snow, the ice, and all the phenomena which winter presents, are comprehended within the plan of Supreme Wisdom for the well-being of created nature.

You can no where cast your view, but objects present themselves to call forth your piety; when you see the snow melt, the ice dissolve, and day after day glide with rapidity, you may reflect upon the short and uncertain span of life. If all the comforts which ease and affluence can impart are within your possession, think of those unfortunate people who, destitute of the common necessaries of life, are sinking beneath the rigours of the season, and whom you are loudly called upon to assist with a portion of your superfluities. But above all, cultivate your mind; supply it with those rich materials of knowledge which no earthly power can bereave you of; and whilst you thus enlarge your mind, keep alive all the feelings of your heart, let it ever pulsate to the happiness of your fellow-creatures, and never die but from the misery you cannot relieve. You will then be able to regulate your passions, to disregard sensuality, and rise superior to all trifling and sordid emotions. You will never have occasion to fly to dissipation to enable you to pass the tedious length of the day; whilst others are indulging in debauch, and in sinful pleasures, you will, from the workings of your mind, and from the contemplation of the works of God, whether you are in the privacy of retirement or in the company of those whom you love and esteem, find pleasures the most exquisite, because they are pure and unalloyed, and permanent, because they are furnished by the mind, which lives for ever. Whatever tends to abstract our thoughts from the petty occurrences of terrestrial objects, and fix them upon God and the effects of his wisdom, advances the dignity of our nature, renders our minds noble and elevated, and diffuses over the soul a sensation of that felicity which we have reason to believe is the portion of the angels of light; and the continuance of which, according to our several degrees of merit, we may hope to experience in the blessed regions of eternal purity and truth.

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JANUARY XXIII.

THE FEAR OF APPARITIONS.

During the long dark nights of winter, many people are troubled with a ridiculous fear of apparitions. At the period when the natural imbecility of man was more a prey to superstition than it is in this more enlightened age, such idle fears were less reprehensible, because they were imbibed in childhood, and communicated through the impressive medium of religion. But that such notions should still disgrace an intellectual people is remarkable. It shows how ready the invention of man is to be employed in conjuring up monsters, and in tormenting himself: as if there were not already enough of real evils to afflict him, he creates imaginary ones, and becomes wretched because he thinks he is so. How wretched is the miser through his fear of thieves; the misanthrope, from his doubt and mistrust of all who surround him; and the discontented man, from dissatisfaction with his condition, and anxiety for the future! Hence let us learn to guard against the illusions of the imagination, which not only during the night presents spectres to our view, but also, in the day-time, often deceives us by painting vice in alluring forms and attracting colours. Happy should we be if we were as eager to fly from the temptations to evil as we are from the imaginary terrors of an apparition.

Whence is it that some people, whose courage in real danger never shrinks, are violently affected by these chimeras? Because their imagination clothes its objects in colours much more glowing than they really possess, and in this case, being perverted before reason can operate, terror has completely possessed the mind. Admitting the existence of spectres, why should the return of one from the dead so horribly shake our nature, when we live in the certainty of being one day transported into a world of incorporeal beings? Though we are convinced that every moment brings us nearer to the presence of the eternal God, we feel no fear from such a conviction; yet were an apparition at midnight to interrupt our repose, and announce the decree that we must soon follow it to an unknown country, the boldest amongst us would feel an emotion of terror, and await the event with the utmost torture of suspense. Yet we regard not the voice of the Most High, which cries, 'Prepare, O Israel, to meet thy God!' Let us not give up our minds to unnecessary alarms, but rather fear that Being at whose coming the hearts of the bravest will be appalled, and the wicked shall call upon the mountains to hide and the hills to cover them. Fear to do that which is contrary to the will of God, and you may banish every other fear, and sing with David, 'The Lord is my light, whom shall I fear? The Lord is the strength of my soul, of whom shall I be afraid?'

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JANUARY XXIV.

SUBTERRANEOUS FIRES.

There are certain phenomena occasionally observed which strongly prove the existence of subterranean fires. Terrible eruptions of inflammable matter, from time to time, take place. The two most known and most considerable mountains which produce these effects are Etna in Sicily, and Vesuvius in the kingdom of Naples. The accounts given of these two volcanoes are very terrible. At different intervals vast eruptions of fiery matter issue. Sometimes only a black vapour is seen to arise, and at the same time are heard hollow rumbling noises, often succeeded by strong flashes of fire, and peals like thunder, accompanied with the sensation of an earthquake. The vapour then becomes luminous, and showers of stones and lava are evolved, part of which falls again within the crater, though enough of them fall without to lay waste the neighbouring country, and they are sometimes whirled to a considerable distance. These terrible explosions are sometimes even more violent. With the noise of thunder, torrents of burning sulphur, and liquid metals, enveloped with clouds of ashes and smoke, are hurled to an immense distance; rocks, upborne by the force of the explosion, fall with a dreadful crash; and cataracts of fire pour down the steep of the mountain; the deluge sweeps over the villages, plantations, and cities; the earth rocks, and they who escape the flood fall within the gulph made by the earthquake, or, tossed from wave to wave, are buried in the general wreck.

JANUARY XXV.

OF COMETS.

That remarkable star which derives its name from the vapour which surrounds it, may justly be ranked amongst the heavenly bodies which form a part of our system. Like our planets, it has its revolution round the sun; but it differs from them all, by its peculiar motion, orbit, and figure. Seen through a telescope, a comet appears full of spots and inequalities; but a thick vapour frequently renders it impossible to observe its figure. The number of comets in our system is about twenty-one, moving in different directions, varying in size, and of much greater density than our earth. Their figure is not always round, and they are not always equally luminous. The train, or tail, is so transparent, that the fixed stars may be seen through it, and sometimes it extends to an immense distance in the heavens; the farther it reaches the broader it seems to become, and is at times divided into rays. When nearest the sun, the heat of a particular comet has been computed by Newton to be two thousand times hotter

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than red-hot iron, and it would retain this heat until it came round again, though the period should be more than 20,000 years.

What we have just advanced on this subject is the result of observations made by astronomers. But there are many things concerning the heavenly bodies which we can never understand; and many of them are entirely removed from our sight. Is a comet an aqueous planet, or a burning globe? Can it be inhabited, when at one time it is placed so near the sun that the heat must be excessive, and at other times passing far beyond the orbits of other planets, it is immersed in the utter darkness, where the suns ray's have no influence? Has the Great Judge of the earth destined comets for the abode of the unrighteous and the chastisement of the wicked? Shall these erratic bodies one day become the means of turning the planets from their orbits, and effecting their destruction? Or, are they still deserts, without form and void, as was the earth before the Creator made it habitable and fruitful? These questions cannot be resolved by natural wisdom; and from our incapacity in this respect we may learn humility, and be convinced how very limited are the powers of the human understanding.

Men too frequently neglect this truth. Were it present to their hearts, the appearance of a comet would not raise in their minds so many vain conjectures and fruitless opinions. Some men regard comets as the precursors of Heaven's judgments; and some read in their aspect the destiny of nations and the fall of empires. Others again predict, from their appearance, wars, famine, and plagues; and consider them as the severest scourge of man. These superstitious people never reflect that a comet is a natural body which does not derange the order of the universe, and the return of which may be calculated with certainty; neither do they consider that this body, as well as the other planets, must have a much more important destination than that which superstition allows them. Are we to be told that the Supreme Almighty Wisdom has placed these immense and magnificent luminaries in the firmament, to announce to a few poor creatures the fate which awaits them?

JANUARY XXVI.

OF SNOW.

Although snow is very familiar to every one at this season of the year, its formation is sufficiently interesting to delight a mind fond of reflection.

Snow consists of watery particles frozen in the air: frozen water becomes ice; and snow only differs from ice in this respect, that the water which constituted ice has been frozen when in its ordinary density, whilst the water which forms snow has been frozen when its particles were separated and reduced to a state of vapour. It has been proved

by experiments that snow, at the first instant of its falling, is about twenty-four times more rare than water, and occupies ten or twelve times the space it does when dissolved.

The formation of the flakes of snow is both curious and beautiful: and were it not so familiar an object, would certainly fill us with astonishment. Let us, each time we see the thick flakes descend from the heavens, think of the benevolent Creator of nature, "which loveth all his works: which scattereth his snow like wool, and his hoar-frost like the shining pearls; which commandeth the cold to bless and to fertilize the earth, and to whom be rendered, for ever and ever, all praise, honour, and glory."

JANUARY XXVII.

RAPIDITY WITH WHICH LIFE PASSES AWAY.

That life is transitory, and the thread of existence very fragile, we have ample experience from the earliest glimmerings of reason: every thing around us serves to evince the uncertainty of time. Let us consider how rapidly the days have fled and the years have elapsed, and how imperceptible has been their flight! If we attempt to recall them to our memory, to follow their rapid course, we shall find ourselves unequal to the task, and unable to mark the different epochs, unless they have been memorable for some remarkable incidents, which have made a forcible impression upon our minds. How many years of infancy, devoted to the diversions of that tender age, have fled unheeded, and left not a trace behind! How often during the giddy thoughtlessness of youth, when beguiled by passions, and pursuing wild pleasures, we had neither opportunity nor desire for reflection!

When succeeding years have rendered a change of habit necessary, some have thought that they would act more as became rational beings; but the cares of the world occupied their attention, and so possessed their souls as to prevent their reflecting upon the manner in which their hours had been passed. Their family increases, and their cares and efforts to provide for their necessities likewise accumulate. Old age insensibly approaches, and perhaps there will then be an equal inability and want of leisure to reflect upon the present, or to remember what they have done, and what they have neglected to do; thus they never know the great end which they were designed to answer in the creation.

Let no one defer reflecting upon this state till old age; for he can never be certain of attaining to it. So delicate is the tree of life, that with difficulty it advances to maturity: often nipped in the bud, it perishes before its petals have expanded; even shoots of vigour, which promised to flourish with strength and with beauty, have their sap withered, and die. To leave the language of metaphor, how many

a noble youth, formed in nature's fairest mould, just as his virtues are beginning to open, and his mind to beam, bows beneath the pale messenger! How many of the softer sex, with charms sweet as the opening morn, whose attractive graces entwine the heart, live but to show the beauty of nature, and then, as if too refined for this sphere, wing their flight to purer regions! If we are permitted to pass the period of youth safe from the dangers which threaten, we are still uncertain as to the continuance of another hour. Let this reflection then induce us ever to live as if the present day was to be the last of our existence, and we shall then pass the time in employment suited to the nature of intelligent and rational beings.

JANUARY XXVIII.

HOAR-FROST OBSERVED ON THE GLASS OF WINDOWS.

In this little phenomenon we may observe with how much simplicity, variety, and order, nature arranges her least productions. Though we frequently admire the extraordinary figures which the frost on glass presents to us, we seldom consider them with much attention. This phenomenon is occasioned by heat, which in a close apartment seeks to diffuse itself on all sides, and to penetrate cooler bodies. Hence it glides through the close contexture of the glass, and in passing through, leaves on the inside the portions of air and water to which it was united: it forms a cloud, which thickens as the heat passes out, till there remains too little in the chamber to hold the particles of water on the glass in a state of fluidity, and these becoming congealed, produce that diversity of appearances with which the windows are covered. The beginning of these figures is formed by small filaments of ice, which insensibly unite: we at first see lines extremely fine, from which others proceed, which in their turn produce fresh filaments, resembling those which grow from a quill. When the frost is strong, and the first crust of ice is thickened, the most beautiful flowers, and lines of various kinds, sometimes straight, sometimes spiral, are produced. We may here learn a truth very essential to our happiness. Consider the flowers which the frost has pourtrayed on the glass; they are beautifully and artificially varied: yet one ray of the noon-day sun effaces them! So the imagination paints every thing beautiful to us: but whatever it represents as attractive, in the possession of the goods of this world, is but a pleasing image, which the light of reason will dissipate.

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JANUARY XXIX.

ON THE USE OF BREAD.

Of those aliments which are distributed with such abundance for the support of man, none seems to be more general or more necessary than bread. It is consumed alike by the poor and the rich, by the sick and by the healthy; and would seem to be the food more particularly designed by nature for our support, and we find the plant which produces the materials for its preparation will grow, and its fruit be matured, in almost every climate. We eat bread with pleasure from infancy to old age, whilst a continued succession of the richest viands cloys and satiates. Let us, then, each time of breaking bread, be mindful of its great utility, and be grateful to the bounteous Giver of good for such a blessing. But how can we render our gratitude more acceptable, than by dividing a portion of the bread which we possess in abundance amongst those who have received a more limited quantity? And by doing this, each time that we break our fast, we shall have the pleasing satisfaction of knowing, that the mouths of the hungry are filled, and the needy sent away rejoicing for the plenty which the favour of Heaven permits us to enjoy.

JANUARY XXX.

OF OUR DUTY IN RESPECT TO SLEEP.

It is painful to observe that most people abandon themselves to sleep with the utmost carelessness. Considering it only in respect to our bodies, the change produced in them by sleep is very considerable and important. If we consider it in other respects, and reflect upon what may take place during the awful stillness of the night, it appears to me, that we ought never to resign ourselves into the arms of sleep without due reflection upon our state, and being in some degree prepared for what may take place.

How thankful should we be to the Creator for the blessings of sleep! Those whose hearts are oppressed with grief, whom doubts and anxiety assail, whom maladies afflict, tossing on their pillow, a prey to care and distracting thoughts, alone can estimate the value of sleep, or know the sweets of its influence. Let not its treasures be abused; do not indulge them to excess, by suffering indolence and effeminacy to prolong your slumbers beyond the time which nature seems to require; nor suffer avarice, ambition, or any passion, to curtail the necessary hours of repose. Above all, endeavour to secure a pure repose by the tranquillity of your mind; let it not be ruffled by contending emotions, nor disturbed by the pangs of a conscience ill at rest; and be well prepared to meet the presence of your God; for

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you know not but this night you may be amongst the number of those who lie down to rise no more. Let this be your thought: 'If during this night my soul is required of me, am I ready to stand before my Maker, before that Being from whom nothing is hidden? We daily feel our deficiencies, and the weakness of our hearts; which we beseech the Lord to pardon and to blot out from all remembrance, for the love of Christ Jesus.'

JANUARY XXXI.

OF THE REVOLUTIONS WHICH ARE CONTINUALLY TAKING PLACE IN NATURE.

All the vicissitudes of nature are derived from those immutable laws, which the Creator established when he made the heavens and the earth to rise out of chaos. Since that period, upwards of five thousand years have passed away, and the inhabitants of the heavens and the earth have witnessed at certain times the return of the same vicissitudes, and of the same effects; they still continue to see that sun, that moon, and those stars, which God once formed, revolve with regularity in their destined course, and perform, with uniform order, their allotted revolutions. If we ask what power overrules them, what influence determines their course, their order, and regularity, what force governs their destination, and preserves them from clashing in their orbs, or from whirling off into the vast space of heaven, we are led to the great First Cause of all things, the Almighty God, who has marked out the circle they are to describe in the heavens, who directs their course, and preserves the beauty and the harmony of the universe with wisdom and power too great for finite beings to conceive or to comprehend.

Nearer to us, the elements are in continual agitation. The air is ever in motion, and the waters unceasingly flow; rivers beginning with small and imperceptible sources, increased by a thousand tributary brooks, form streams, which rising in their course, swell to an amazing bulk, and roll majestically towards the ocean, into which they incessantly heave their accumulating waves. From the sea's vast surface vapours arise, and collected in the sky, form clouds, which continually breaking, shower down the collected water in the form of rain, hail, or snow; and this, penetrating the bosom of the earth, and making its way into the depths of the mountains, supplies the original sources of the streams, thus preserving an endless circulation.

The seasons continue for a limited term, and succeed each other in the order prescribed from the beginning of time. Each year the earth resumes her fertility, vegetation flourishes, and the returning harvest gladdens her inhabitants: her gifts are never exhausted, because her productions are always returned to her. Winter arrives at the appointed time, and brings the necessary repose; when this is obtained,

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spring succeeds, and nature awakes from her short sleep with gayety, pleasure, and love. This circulation is observed in every living creature; the blood transmitted from the centre flows by different ramifications of vessels to the most distant parts of the body, imparting to them life and vigour, and then returns to the heart, whence it proceeded. All these revolutions lead us to the contemplation of Him who fixed their foundation at the creation of the world, and has since by his power and his wisdom continued to direct them with unceasing perfection.

We have now seen the conclusion of this month, which is gone for ever; we can never experience its return under exactly the same circumstances. The period will at last arrive when all the vast machinery of this universe must stop, and all its wheels be motionless; when the spheres shall cease to roll, and all the defined periods of time be lost in eternity. But the infinite and immutable God will still remain, and with him all those into whose nostrils he has breathed the breath of life.

FEBRUARY I.

EVERY THING IN NATURE CONDUCES TO THE GOOD OF MANKIND.

It behoves thee, O man! to be deeply sensible of the love and preference with which God has honoured thee, in distinguishing thee from all other creatures, by so many advantages. Acknowledge, as thou oughtest, the privilege of being peculiarly the object of the Divine liberality, of being the chief of whatsoever he has formed for the manifestation of his glorious attributes. It is for thee that all nature labours; in the earth, the air, and the waters. For thee the sheep is clothed with wool; the horse by his horny hoofs is enabled to bear heavy loads, and climb the most rugged steeps: the silkworm spins her soft web; the fishes in the ocean are nourished; the bee burrows in the bosom of the sweetest flowers, and extracts their treasures; the stubborn ox submits to the yoke: and for thee the forests, the fields, and the gardens, are exuberant in riches, the very mountains are fruitful, and the depths of the earth reward the toil of him who explores their recesses.

It is true that, compared with other animals, thy wants are very numerous; but thou art infinitely better provided with faculties, talents, and industry, to make every thing around thee subservient to thy utility and pleasure. Thousands of creatures contribute to nourish thee, to clothe, to make thy habitation, and to furnish thee with comforts and conveniences innumerable.

But the bountiful Creator has not rested here; he has not merely provided for thy wants, he has condescended to procure thee every variety of charms: for thee the lark carols her lay, and Philomela makes the groves echo to her song; the meads and the lawns charm

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thee with their varied beauties; and the air far round smells sweet with the flower-scented breezes. But thou art infinitely blessed beyond all these, in that noble faculty of reason, which makes the haughty lord of the forest crouch at thy feet, and the monarch of the ocean contribute to thy riches; which enables thee to walk abroad through nature, and contemplate the grandeur, beauty, and magnificence of her works, and not to rest satisfied in the admiration of their order and harmonious catenation, but to reflect upon the first cause of their being; and though removed from their presence, to be still able to enjoy endless delight, from the pleasing recollection of their beauty and sublimity, heightened by the power of imagination.

Such meditations as these could not often fill the mind, without our hearts being warmed with the sensations of love and of gratitude for the Divine Creator. When we look around us, and contemplate the vast spectacle of nature; if we soar into the heavens, or dive down into the deep; we shall find all created things ultimately conducing to our good. And surely we cannot more effectually answer the great end of our being, and in some degree requite the goodness of God, than by cultivating those talents which he has been graciously pleased to confer upon us, and calling forth all those finer feelings of the heart which he has permitted us to enjoy. Without the one, we shall never be able to comprehend any portion of the sublimity of nature and nature's works; without the other, in vain will the sighs of the miserable break upon our ear, or the pangs of the afflicted meet us in the way. The storm may howl around, and the tempest roar, but secure in ourselves we shall be regardless of another's suffering. The consequence must then be, a conscience seared, a mind weak and contracted, and a heart alive only to villany and ingratitude. Can such ever be the language of Christianity, or the conduct of Christians; of men for whom ineffable happiness and joy is in store, who are looking forward to the holy kingdom of Christ, "where shall be alone found pleasure without alloy?"

FEBRUARY II.

OF THE INFLUENCE WHICH COLD HAS UPON HEALTH.

In these severe winter months, it is not unusual for many people to be lavish in their praises of the other seasons. Spring, summer, and autumn, whilst we enjoy their blessings, are little attended to; but when we no longer profit by their advantages, we praise them beyond measure. It is usual with men to disregard their present benefits, and only begin to feel their value when they can no longer enjoy them. But is it true that those three seasons alone possess every advantage? Is winter really so great an evil as some represent it to be? These are important questions, as they considerably influence our content and repose.

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Spring and autumn are sometimes dangerous from the great and sudden changes of temperature, and the frequency of epidemic diseases; and in summer the heat is very oppressive, and productive of debility and various maladies. In winter these inconveniences are not experienced, the health is generally better, the body more vigorous, and the spirits cheerful. In summer, when sinking under the fervency of the sun's rays, how we sigh for the shady retreat, and the evening breeze, to refresh our languid frame; whilst during the cold of winter we are active and alert, and rarely find the cold so intense that exercise will not procure us a grateful warmth.

Thus even winter may contribute to our health, and to our pleasures; the Creator has provided for our good in this equally as much as in the other seasons: if we are discontented, if we do not enjoy so good a state of health, the fault probably rests with ourselves. Perhaps we pass the time in idleness and inactivity, and, immured within close and heated rooms, never breathe a pure air, nor go abroad to enjoy many of the days which really are very favourable and mild; or, a prey to anxiety and distrust of the future, our days and our nights are consumed in hopeless lamentations; or we corrupt our morals, and destroy our health and peace of mind, by intemperance. How happy might man be, how regular his health, if he never violated the laws of nature nor departed from the due bounds of moderation! if he made repose alternate with labour, and pleasure with business! Let us then henceforth apply ourselves constantly to fulfil the great designs of the Creator towards us; and serenity of mind, and gayety of heart, will render our days cheerful, whilst virtue and temperance will make our disposition mild, and our health firm.

FEBRUARY III.

A UNIFORMITY OF TEMPERATURE WOULD BE DISADVANTAGEOUS TO THE EARTH.

Many people suppose that the earth would be a paradise if throughout the globe there was an equal distribution of heat and cold, the same degree of fertility, and the same division of day and of night. But admitting that things were thus arranged, and that in every part of the world there was the same degree of cold and of heat, is it true that mankind would gain by such a regulation more of nourishment, of convenience, or of pleasure? On the contrary, if God had complied with such foolish desires, the earth would have been a miserable and sorrowful habitation. By the present wise arrangement, there is an infinite diversity in the works of nature. But what a sad uniformity would reign, how the earth would be spoiled of her beauties and her charms, if the revolutions of the seasons, of light and of darkness, of cold and of heat, were no longer to take place. Thousands of plants and of animals, which can only multiply in countries where the heat

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is at a certain degree, would soon cease to exist. Amongst the immense variety of natural productions, very few can live in all climates. The greater part of creatures inhabiting cold countries could not support the heat of warm climates; whilst those transported from the torrid zone to the regions of the north could as ill bear the change. If, then, a uniformity of temperature existed, many natural productions must perish, and nature being deprived of the charms of diversity, we should lose innumerable blessings.

If every country of the earth produced the same things, wore the same appearance, and possessed equal advantages, the necessity of intercourse would be done away; commerce must cease, and many arts would remain unknown: the sciences also would suffer from the want of communication. Besides, how should we be able to regulate the degree of heat and fix the temperature? Was it every where as hot as in the torrid zone, who could support the temperature? For those regions which are cold always withdrawing a portion of heat from those which are hotter, the heat diffused through the earth would much exceed that of the torrid zone; and thus men, plants, and animals, must all perish. Suppose again a temperate heat should every where pervade the earth, of such a degree of temperature as should be beneficial to all creatures, the air must then have the same degree of elevation, density, and elasticity. But if this were to take place, one chief cause of the winds would be removed, and the most disastrous consequences must result from their cessation. The air would become loaded with impurities, the equable degree of heat over the earth would occasion maladies, contagions, and plagues, and our imaginary paradise would be converted into a desert.

Wise and beneficent Creator! all that thou hast done is good. This confession is the result of the reflections I have made whilst contemplating thy works. I wish always to think thus at the sight of every object which nature presents; and, instead of vainly imagining faults and imperfections, may I ever call to mind thy infinite wisdom, and the weakness of my own capacity!

Many things which at first view appear contrary to the order, and unnecessary to the utility, of the universe, are arranged with wisdom, and regulated by goodness and beauty. What may to me seem insufficient and imperfect, furnishes to men of a more enlarged understanding subjects of just admiration, and calls forth their praises of the infinite perfections of the Creator. As in nature he has made an apparently unequal distribution of cold and heat, of light and darkness; so also he has displayed great diversity in his dispensations towards rational creatures, and has not assigned the lot of each in a similar manner. Yet in this, as in nature, his ways are ever the ways of wisdom and love; all that the Lord has ordered and regulated is perfect and admirable; all his paths are mercy and truth: to him be glory for ever and for ever.

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FEBRUARY IV.

CONSIDERATION OF THE STARS.

To every person who delights to reflect on the works of God, the firmament of heaven, where the resplendent stars roll their vast orbs, opens a noble field for observation. The harmony, the grandeur, the multitude, and the brilliancy of these celestial spheres, offer a most enrapturing spectacle to him who loves silently to contemplate the works of nature. The appearance of the stars alone, supposing even that we had no knowledge of their nature and design, would be sufficient to fill the soul with joy and with admiration; for where can we see an object so striking and magnificent as the expanse of ether, resplendent with the varied luminaries, which, in their several degrees of magnitude and brightness, traverse the heavens in cloudless majesty? But can we suppose that an infinitely wise Being has adorned the celestial canopy with these sublime objects merely as a beautiful spectacle or picture? Would he have formed those suns merely that the inhabitants of this earth might have the pleasure of seeing in the firmament a number of luminous points, of whose nature and destination they know little, and which are often not to be seen at all? No one who takes a broad survey of nature, and observes the wonderful harmony and agreement between all her works and their proposed end, can suffer such an idea to enter his mind. We cannot doubt but God, when he ordained the stars to shine, had a much more exalted view than to procure for us an agreeable sight. Though we cannot precisely determine all the particular ends which they may serve, it will not be difficult to acknowledge that one of their uses is the advantage as well as ornament of this world, of which the following observations will doubtless convince us.

Amongst those stars which are most easily distinguished, there are some constantly observed in the same part of the heavens, and which we always see immediately over our heads. These are certain guides to those who travel during the obscurity of night, by sea as well as by land. To the mariner they point out his course, and enable him to reach the place of his destination. Other stars vary their aspects, and though they always preserve the same situation with regard to one another, they daily, with respect to us, change the order of their rising and setting; and their variations, which are performed in regular order, are to us of great utility; they serve to measure time and to regulate it by fixed laws. The constant and stated revolutions of the stars accurately determine the end and the return of the seasons. By these means the labourer knows precisely when to trust his seeds to the earth, and in what order to conduct the cultivation of the fields.

But whatever benefit the stars in these respects may contribute to the earth, we ought not to presume that is the only or the principal end which God has proposed in the creation of these wonderful bodies.

Is it possible to believe that the wise Creator has filled the immense expanse of ether with millions of worlds and of suns, merely, that a few individuals of this earth may be enabled to measure time and ascertain the return of the seasons? Doubtless these numerous globes are formed for much nobler purposes, and each one has its particular destination. All these stars being so many suns, with the power of communicating light, heat, and animation to other spheres, is it probable that God should have endowed them with this power in vain? Would he have created suns which can shoot their rays far as the earth, unless he had also created other worlds to enjoy their benign influence? Would God, who has peopled with so many living creatures this earth, which is but as a point in the heavens, have fixed in the regions of space so many vast orbs, desert and uninhabited, fruitlessly to roll their course? Certainly not. We have every reason to believe that each of the fixed stars which we see over our heads by thousands, one above another, and all around, far as the eye can penetrate, and yet farther, to distances immeasurable by our limited faculties, are suns equally resplendent as that which beams on our horizon, the life of our system; have each worlds revolving round their centre, and receiving the blessings of their influence. We may also suppose that these spheres serve as abodes to different orders and species of living creatures, all rejoicing in the power and celebrating the magnificence of God. Though these are only conjectures, formed from the little we know of the wonders of nature, yet they are conjectures which fill the mind with awe and reverence, open to it a vast and boundless field of thought, do away the contracted and partial notions we may entertain of ourselves, and tend to soften and to ameliorate our hearts.

FEBRUARY V.

CURIOUS FORMATION OF THE EYE.

The eye infinitely surpasses all the works of human industry. Its structure is the most wonderful thing the understanding of man can become acquainted with: the most skilful artist cannot invent any machine of this kind which is not infinitely inferior to the eye; whatever ability, industry, and attention he may devote to it, he will not be able to produce a work that does not abound with the imperfections incident to the works of men. It is true we cannot become perfectly acquainted with all the art which Divine Wisdom has displayed in the structure of this beautiful organ; but the little that we do know, suffices to convince us of the admirable intelligence, goodness, and power of the Creator.

In the first place, the disposition of the exterior parts of the eye is excellent. How admirably it is defended! Placed in durable orbits of bone, at a certain depth in the skull, the globe of the eye cannot easily suffer any injury. The over-arching eyebrows contribute

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much to its beauty and preservation; and the eyelids more immediately shelter it from the glare of light, and other things which might be prejudicial; inserted in these are the eye-lashes, which also much contribute to the above effect, and also prevent small particles of dust and other substances striking against the eye.*

The internal structure is still more admirable. The globe of the eye is composed of tunics, humours, muscles, and vessels; the first coat is called the cornea, or exterior membrane, which is transparent anteriorly, and opaque posteriorly; next, the choroid, which is extremely vascular; then the uvea, with the iris, which being of various colours, gives the appearance of different coloured eyes, and being perforated, with the power of contraction and dilatation, forms the pupil; and, lastly, the retina, which is a fine expansion of the optic nerve, and upon it the impressions of objects are made. The humours are, first, the aqueous, lying in the fore-part of the globe, immediately under the cornea; it is thin, liquid, and transparent: secondly, the crystalline, which lies next to the aqueous, behind the uvea, opposite to the pupil; it is the least of the humours, of greater solidity, and on both sides convex: the third is the vitreous, resembling the white of an egg; it fills all the hind part of the cavity of the globe, and gives the spherical figure to the eye. The muscles of the eye are six, and by the excellence of their arrangement it is enabled to move in all directions. Vision is performed by the rays of light falling on the pellucid and convex cornea of the eye, by the density and convexity of which they are united into a focus, which passes the aqueous humour and pupil of the eye, to be more condensed by the crystalline lens. The rays of light thus concentrated, penetrate the vitreous humour, and stimulate the retina, upon which the images of objects, painted in an inverse direction, are represented to the mind through the medium of the optic nerves.

Thus we have abundant cause to thank the God of mercy who has so exquisitely formed the eye, and to acknowledge the wisdom, power, and admirable skill displayed in its structure and wonderful organization. May we never forget the benefits we have received, nor the blessings we enjoy, but ever look up to the Author of our being with gratitude! When we see the various woes and miseries which afflict many of our fellow-creatures, let not our eyes refuse the tear of sympathy, nor our hearts be shut against compassion. May tears of joy flow from every eye, when we receive the renewed proofs of God's goodness and love; and let us rejoice when we are enabled to soothe the anguish of our afflicted brethren, or wipe the tear from the poor and the disconsolate. Thus shall we fulfil the design of our Maker, and enjoy the approbation of our God.

* Besides these, amongst the external parts are enumerated the lachrymal gland, which secretes the tears; the lachrymal caruncle, a small fleshy substance at the inner angle of the eye; the puncta lachrymalia, two small openings on the nasal extremity of each eye-lash; the lachrymal duct, formed by the union of the ducts leading from the puncta lachrymalia, and conveying the tears into the nose; the lachrymal sac, a dilatation of the lachrymal canal.—E.

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FEBRUARY VI.

THE FOG.

Amongst the numerous phenomena which we see in winter, a fog or mist particularly merits our attention. It is formed of exhalations, which occupy the lower region of the atmosphere; they arise from the earth, and are condensed by the greater coldness of the surrounding air. During the continuance of a mist, a grey mantle is spread over the face of nature; every object is imperfectly seen and enveloped in obscurity; the eye often in vain attempts to pierce the thick curtain; all is confused and indistinct; the rising sun slowly disperses these vapours, which at length are gradually dissipated; his power is confessed, obscurity vanishes before his rays, the surrounding objects are restored to our view, and the heavens resume their wonted light and beauty. The mist is, however, still seen on the earth, but it is close to the ground, or hangs on the roofs of houses; and the horizon, so long veiled from sight, now opens upon us. As the face of the earth, before the sun beams upon it, is overspread with fog, dew, and vapours, so once were the blessed regions of science and of knowledge enveloped in the thick mist of ignorance and of superstition; whole countries were obscured, kingdoms obumbrated, and darkness ruled with a leaden sceptre the grovelling race that licked and grew fat beneath her chains; whilst error, prejudice, and sloth, so clouded their faculties and benumbed their feelings, that light was not sought for, nor wisdom esteemed; human reason was no more, and innocence had retired. At length the moment arrived, when, the measure of their iniquity being filled, the triumph of darkness, of ignorance, and of superstition was to cease. The sun once more dawned, and flashed such a steady blaze of light from the horizon, that the gloom, which for centuries had buried man in obscurity, and rendered torpid all his powers, at once fled, overpowered by the fervency of the beams which penetrated her secret recesses, and exposed to the face of day the horrors of her naked deformity. But, because in this day of light and of truth we are much superior to those dark ages in every thing that can dignify and bless human nature, let us not think our work completed, and that we have no more to do. Though, emerging from Gothic gloom and Vandalic darkness, the light shines with greater brilliancy and power, we are still young in knowledge, and very ignorant of the true and pure tenets of religion, which still labours to throw off the shackles of ceremony and the yoke of superstition, with which the ignorance, the presumption, and the audacity of man has obscured her simplicity and sullied her purity. The blessed period is probably hastening, when an enlightened race of men shall look back upon our generation with as much compassion as we now feel for the victims of oppression and monkish superstition, in what we are pleased to call the dark ages.

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FEBRUARY VII.

OF THE TIDES.

The greatest part of the surface of the earth is covered with water, which is called sea, and is very distinct from lakes and rivers. These contain more or less water as the season is dry or humid, whilst the vast body of the ocean ever preserves its bulk unaffected by such contingencies. Twice in the day it ebbs and flows according to certain rules; when at its greatest height on any shore it begins to decrease, which lasts about six hours, and is called the ebb. At the end of six hours it begins again to flow, and continues to increase six hours longer, when it gains its greatest elevation; it then again retires, and rises again in the same space of time; so that in twenty-four hours the sea has twice ebbed and twice flowed.

The regular and alternate motion of the sea is called its flux and reflux, or ebbing and flowing, and constitutes the tides. When it rises and flows towards the coast it is called flux, when it retires from the shore, reflux. These tides are chiefly influenced by the moon, and in some degree by the sun, and are greatest during the new and the full moon, and least in the quarters. When both the luminaries are in the equator, and the moon at her least distance from the earth, the tide rises the highest. The greatest tides do not happen till after the autumnal equinox, and return a little before the vernal. Their motion is more remarkable in the ocean than in small seas, and would continue for a great length of time though the sun and moon were to be annihilated. There is some little variation in the flux and reflux, which causes the tide of the succeeding day to be rather later than that of the preceding one; and they do not return at the same hour till the expiration of thirty days, the period of a lunation.

Thus we find the tides are affected by the changes of the moon, and influenced by its power of attraction; the sun also contributes to their production, and the combined action of these two luminaries furnishes a complete solution of all the phenomena presented to us by the flux and reflux of the sea. The advantages arising from the tides are great; by their means, the streams of rivers being checked in their course to the sea, the bed of the river becomes deeper, and ships of the largest burden are enabled to sail up their channel with safety; vessels approaching bays wait for this increase of water, and then enter in security: aided too, by the tides, they sail up rivers against their natural course, and carry the means of plenty and abundance into the interior of countries. Another great advantage in the tides is, that by their means the waters of the ocean continually roll to and fro, and are thus preserved fresh and free from putridity and stagnation; for though frequently agitated by winds, and often perturbed by a storm, the waves would soon recover from such partial interruption, and regain a state of calm, were it not for the continued flux and reflux of the tides. From this ebbing and flowing of the sea

we may call to mind the fluctuation of life, which increases to a certain height and then declines. Every thing in this state of probation is fluctuating and of uncertain tenure; no joy, no pleasure is permanent; the gayest moments of happiness, the hours of mirth and of festivity, suddenly depart; and man, in the despondency of his heart, feels the misery of his existence, and sighs for a state of purity and of happiness, where the troubles, the cares, and the sorrows which here afflict and render comfortless his being, can never intrude to disturb his felicity, or molest his repose. Let us then, by the integrity of our conduct, the propriety of our actions, and the humanity of our hearts, merit the reward of a hope-inspiring certainty of obtaining such a happy abode, to cheer us on our way through this dreary pilgrimage; and when anxious and ready to faint, to gladden our souls with some bright gleams of the heavenly regions, where bliss, and ecstacy, and perfect felicity, for ever dwell.

FEBRUARY VIII.

THE SUN IS NOT ALWAYS APPARENT.

The heavens are not continually obscured by clouds of rain and snow. After showering down their contents upon the earth, they sometimes separate, and serenity again diffuses her cheerful smiles throughout the sky. The aspect of the sun, after an obscurity of many days, again animates life, and fills the creation with joy and youth; from his appearing so seldom in winter, and then for only a very short space, we better know how to appreciate his blessings. And, perhaps, this will hold good with regard to many other gifts of Providence: we are too apt to consider the choicest blessings of life with indifference, if constantly in our possession. Health, repose, friendship, and affluence, with many other benefits which we daily enjoy, seldom appear to men as valuable as they really are; and their true worth is often never felt till they are irrevocably lost. Rightly to know and sufficiently to feel the happiness of a bosom friend, perfect health, and an independent income, we should first have been stretched on the bed of sickness, deserted by our dearest friends, and reduced to the miseries of hopeless poverty.

How uncertain and inconstant is the serenity of the sky in the winter season! How little are we able to rely with certainty upon the possession of the beneficent rays of the sun! At present he shines with unclouded majesty; but soon the clouds will thicken, and, before noon, the splendour and the beauty, which in the morning shone upon the earth, will be eclipsed. Such is, likewise, the instability of all human transactions; we can never promise to ourselves durable pleasures, and uninterrupted felicity. This consideration should render us careful and circumspect in the hour of prosperity, and moderate

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our desire for earthly joys, since every thing is subject to change and inconstancy. Virtue alone is immutable; virtue alone makes us support with unbending firmness, the vicissitudes and the contingencies of life, unmoved by the frowns or the smiles of fortune; and enables us to sustain the mocks and the scorn of the world, whilst we pity and compassionate the weak children of delusion, who show their gilded wings in the sunshine of to-day, and to-morrow are heard of no more.

FEBRUARY IX.

OF EARTHQUAKES.

The earth is subject to two kinds of shocks; one of which is caused by the action of subterraneous fires, and the explosion of volcanoes. These commotions are only felt at short distances, and when the volcanoes act, immediately before a complete eruption. As soon as the materials which form the subterranean fires begin to ferment and inflame, the fire makes an effort in every direction; and, if it does not find a natural vent, throws up the earth with violence, and forces a passage. In this kind of earthquake the shock is more confined, seldom extending for many miles.

But there is another species of earthquake, very different in its effects, and most likely produced by very different causes. In this no eruption takes place, but the shaking of the earth is frequently felt at an immense distance; we have instances of their being felt at the same time in France, England, and Germany: they are accompanied with a deep rumbling sound, and their effects are often dreadfully fatal.

Of all the catastrophes and desolations which have ever visited the earth, none, since the flood, have been so terribly awful in their effects, and destructive in their consequences, as earthquakes. When rivers swelled into rapid torrents burst their banks, and with one immense gush pour upon the neighbouring country, sweeping every thing in their way, there is still some resource; we can fly to the tops of our houses, or ascend the summits of the mountains, and in safety behold the vast deluge, which, soon as its first fury has abated, gently retreats to its former boundaries. But when the earthquake violently perturbs the face of nature, when the earth heaves like the waves of the ocean, agitated by a storm, and opens a tremendous chasm, which receives within its abyss a whole city, vain is the thought of flight, and ineffectual the hope of safety. The thunder roars, and the red lightnings flash, and desolation marks their course; the plague sweeps through a country, and despair and haggard wretchedness track its wide-wasting progress; but in an earthquake, the earth heaves, opens, and whole provinces are seen no more, whilst the perturbation affects half the globe. Who can stand before the Almighty when he exercises his power? Who can oppose the God of Nature when he

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rises to judge the nations? The hills tremble, and the mountains reel to their centre. The foundations of the earth are shaken, and the inhabitants greatly fear. His word consumeth like fire, and the rocks melt at his coming. But let not man vainly imagine that these convulsions of nature are merely to destroy him, when a blast of wind might in an instant lay waste the whole creation. Can any one be so weak as to suppose that the whole artillery of heaven must be employed, when a few individuals are ingulphed in the bosom of the earth? and that to punish the iniquity of a town, or to strike terror into the inhabitants of the earth, nature is to be thus convulsed! Consider rather, in these dreadful visitations, a much nobler and more exalted view. Consider them as instruments in the hands of God, working for the general good and advantage of mankind. Earthquakes answer certain ends in the system of nature, without which it probably could not attain its present degree of perfection; and in all great states, it is found that individual must give way to general good: so also with regard to the earth and its inhabitants, it is better that a small part suffer than that the whole be destroyed. Let us then acknowledge that all which appears terrible in nature, all the seeming imperfections in the universe, are necessary for the due order and preservation of the whole; that partial evils are always to be disregarded; and that all tends to show the glory and perfections of God. We shall then adore and bless his name, though desolation impend and destruction threaten; we shall repose upon him with confidence, and though the final termination of the world may seem to be at hand, and the mountains, hurled from their bases, be plunged into the sea, He will be our protector, our supporter, and sure resting-place.

FEBRUARY X.

UPON LIFE AND DEATH.

God has observed the most exact and wonderful order in the life and death of man; both are measured and regulated in the best manner; and nothing is more evident than the wisdom of God in the population of the world. In a given number of years, a proportional number of people of every age dies. Out of thirty-five or thirty-six living persons, one dies each year: but the proportion of births is rather greater; for ten who die, in the same period of time, and among the same number of persons, twelve are born. In the first year, one infant out of three generally dies; in the fifth year, one out of twenty-five; and so on, the number of deaths lessening till the age of twenty-five, when they again begin to increase. How evident is the care which Divine Providence extends over his creatures! From the very moment of their entering the world he protects and watches over them; the poor as well as the rich enjoy his

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protection. Let us then not anticipate the hour of death with fear, nor render unpleasant our time with apprehensions; but firmly rely upon the all-sufficient arm of God, who will support us through life with tender care, and when it seemeth meet, enable us to resign our bodies to their native dust with firmness, in the confidence of our soul, divested of its cumbrous load, winging its flight with joy to the regions of eternal glory. Let not the supposition of a long life, arising from a present good state of health, make you forgetful of the duties you owe to God and to one another, under the idea that there will be time enough allowed you to prepare for the awful change. Life is extremely uncertain: though from strength of constitution some individuals may not be so liable to illness, they may be hurried off by accidents; and no man, however strong, is secure from contagion. But a much more powerful motive than fear should excite us so to act, that our deeds shall always find favour with the Almighty; the pleasure arising from good actions, which is a constant reward and source of pure delight to the virtuous, the sensations of which are unknown to the wicked, who exchange the only true enjoyment we are capable of, for false and fleeting pleasures, whose consequences are sorrow, disease, and death.

FEBRUARY XI.

FORMATION OF ICE.

When water is exposed to the influence of cold air, it gradually loses its fluidity, and becomes a solid body, which we call ice. This change, which at this season of the year comes so frequently under our notice, is well deserving of attention. Ice is of less specific gravity than water; for if we put a vessel containing water, the surface of which is frozen over, into a temperate heat, the ice soon detaches itself from the sides of the vessel, and floats on the top of the water. One cause of its lightness is the increase of volume; for although the general law of cold is to contract, in this instance, at the time of congelation, such an expansion takes place, that vessels are frequently broken by the power of the dilatation, the violence of which is sufficient to cleave a globe of copper of such thickness as to require a force of 28,000 pounds weight to produce a similar effect.

When the ice first shoots in crystals over the surface of the water it is transparent, but as it increases in thickness becomes opaque, which is owing to the air contained in the ice occasioning a more frequent refraction of the rays of light. Exhalations continually arise from the ice, even during the greatest cold. It is found from experiments that, during the most intense cold, four pounds of ice lose one pound weight by evaporation in the space of eighteen days.

The manner in which ice begins to form is very curious; when it

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slightly freezes, a number of needle-shaped crystals shoot in all directions from the inner circumference of the vessel, making numerous angles, and uniting together, form upon the surface of the water a very thin pellicle of ice; to these succeed more, which multiply and enlarge in form of plates, and being increased in number and thickness unite to the first pellicle. As the ice thickens, a multitude of air bubbles are seen, and the greater the degree of cold, the more these increase. When it freezes very strongly, a thin crust is formed, which shoots from the circumference to the centre; under this others are seen of a triangular shape, with the base parallel to the sides of the vessel, and these soon increase so much that a very thick mass of ice is formed.

By frequently reflecting upon these phenomena, we shall be more and more convinced of the beauty of nature, and of the harmony and regularity that pervade her minutest productions, all tending to fulfil the views of a just and wise God; and though we have not the satisfactory consolation of knowing the full extent of those views, the little we are permitted to understand of them is enough to excite in us the desire of adoring the all-wise Creator, and celebrating his power, whilst we magnify his holy name.

FEBRUARY XII.

SPHERICAL FIGURE OF THE EARTH.

It was once generally supposed that the earth is a vast plain: but were this the case, its external boundaries might be arrived at, and in approaching any place we could not discover the tops of towers and mountains till we had seen their bases. The earth is incontestably proved to be a globe, though not exactly spherical, for it is rather more elevated under the line, and flattened towards the poles, something resembling the figure of an orange. But this deviation from a true sphere is very slight; about fifty miles, a difference scarcely perceptible in a globe whose circumference is 25,020 miles, and diameter 7964. The rotundity of the earth is demonstrable from its shadow in eclipses of the moon being always bounded by a circular line, and by its having been frequently circumnavigated; besides, if it was not spherical, how would the stars appear to rise and to set sooner to the countries eastward than to those more to the west.

Here we have fresh cause to admire the wisdom of the Creator, who has organized this earth with the greatest perfection, with a form so well adapted for the benefit of the inhabitants. Light and heat, which are so necessary to the creation, are by this means distributed with uniformity, and in a more equable degree throughout the earth. It is from this that the due return of day and night is ensured, and that the degrees of heat and of cold, of moisture and of dryness, are rendered so regular and constant. The water is equally distributed

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over the earth, and the winds every where cause their salutary influence to be felt. Had the earth any other figure, we should be deprived of all these advantages: some countries would be like a paradise, whilst others would be in a state of chaos; one part would be buried by the waters, and another parched by the fervour of the sun. Some countries would be exposed to furious tempests, which would devastate and destroy them; whilst others would be exhausted for want of fresh currents of air. One part of the world would be condemned to endure a perpetual heat, and another would be entirely deprived of the sun's rays.

If we did not here acknowledge the all-powerful hand of a wise and beneficent Creator, we must be guilty of the greatest pride and most consummate ignorance! Should we deserve to be the inhabitants of an earth so admirably arranged and exquisitely fashioned, if, upon seeing its beauties and matchless order, and enjoying a thousand blessings, we denied the existence of an all-creative Power, or were wanting in acknowledgments for his mercy and goodness? May we never be guilty of such base ingratitude; but, filled with sentiments of awe and sublimity at the sight of God's wonderful works, may we elevate our thoughts to Heaven, and fixing our minds upon the Divine Power, humbly adore his wisdom and goodness.

FEBRUARY XIII.

SHORT DURATION OF SNOW.

We see the instability of the snow, and the rapidity with which it disappears when played upon by the sun-beams, or exposed to the effects of a humid mild air, and frequent showers. Frequently the whole aspect of nature, in a few hours, assumes a new appearance, and scarcely a trace of snow is left behind. By these sudden changes we may justly be reminded of the inconstancy and vanity of all human affairs. Every season, and every variation that their succession induces, declares to us with a loud and impressive voice, that all is uncertain, all vain, and of short duration. If we look around us through the vast field of nature, shall we find any thing which is not fragile and perishable? How soon are we bereft of the pleasures of sense; scarcely do we begin to enjoy them when they elude our eager grasp! Often when the sun first gilds the earth, we are light, easy, gay, and content, smiling with comfort and plenty; but ere night has drawn her sable curtain, our pleasure is fled, our enjoyment ceased, and grief weighs heavy on our aching heart. Where exists the individual who, at some period or other, has not cruelly felt the uncertainty and short duration of terrestrial joys, and who has not known the pangs of disappointed hope? What is more inconstant than the favours of fortune, or more uncertain than the continuance of life and the blessings of health? Yet whilst we are in possession of these

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benefits, such reflections seldom or never occur; like those who, tempted by the beauty of some winter's morn, sally out unprepared for the storm, which at that season they ought to expect. Whilst fortune smiles, and we live in a round of gayety and pleasure, we laugh at all fears of their ever failing, and despise all thoughts of preparing for an evil day. But fleeting as the snow beneath the sunbeams, are all the enjoyments and gratifications which do not arise from the influence of religion, the exercise of the mind, and the feelings of the heart; cultivate these, and you will be enabled to enjoy a portion of that felicity which endureth for ever—the sure reward of virtue and a well-spent life.

FEBRUARY XIV.

THE CREATION.

The time was when this earth, the heavens and their revolving suns, existed not: God ordained their being, and at his almighty will they arose. Before that period the whole was one huge and shapeless mass, where confusion ruled and chaos held her empire; the earth was without form and void, and darkness was upon the face of the deep. On the first day of the creation the spirit of God moved upon the face of this rude and formless heap, which now felt a motion penetrate deep as the centre, from above, and beneath, and all around. He said, Let there be light, and there was light, and God called the light day, and the darkness he called night. Hitherto the waters and the earth were confounded together, undistinguished from each other. God separated them, and said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters. And God made the firmament, and divided the waters which were above the firmament, and it was so: and God called the firmament heaven: and the evening and the morning were the second day. The waters still covered the face of the earth, when on the third day God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear; let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind: and it was so. On the fourth day God said, Let there be lights in the firmament of heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and for years: and it was so. The sun appeared as the greater light to rule the day, and the moon, with inferior splendour, to rule the night: the stars also were then created. On the fifth day God said, Let the waters bring forth abundantly the moving creature that hath life; and immediately the whales rolled in the ocean, and the seas teemed with life: and the winged fowl he gave to possess the air. And God blessed them, saying, Be fruitful and multiply, and fill the waters in the seas; and let fowls multiply in the earth.

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And God said, Let the earth bring forth the living creatures after his kind, cattle and creeping thing, and beast of the earth after his kind: and it was so. Every thing was now prepared; and God created man, to whom he gave dominion over the fish of the sea, and over the fowls of the air, and over cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. For this purpose he created him in his own image, after his own likeness, and endued with a rational soul. As a companion to man he created woman, with equal gifts and equal rule: to them both he gave dominion over the earth and all created things, and with them he rested from all the works which he had made.

Can any one reflect upon this sublime history without being astonished at the power, the intelligence, and infinite wisdom manifested in the works of the creation? Or can any one peruse it without pausing awhile to admire the grandeur of the objects and the sublimity of the design? Wherever we cast our view we see the proofs of a Divinity, whose glory the heavens declare, whose power unlimited their extent gives to know. It is only by being led from the sight of the objects of the creation to a contemplation of the Divinity, of his attributes, and of our own real condition, that we derive any true benefits from their presence, or even that we deserve to be inhabitants of this fair universe. But we cannot acknowledge the greatness and the glory of God in the works of the creation, without our souls being enlarged, and our hearts penetrated with love and gratitude for the Divine Author. If this truth were universally felt, we should have little need of coercion to deter men from vice, or of lectures to excite them to virtue. Let those whose feelings are not yet callous, walk abroad and contemplate nature, where they will find objects sufficient to arrest their attention, to excite their utmost admiration, and to call forth their charity and their love. Here is the source of every thing that is sublime, beautiful, and enrapturing; and here is ever to be found the Almighty God, who alone is worthy of our homage, our praise, and our adoration.

FEBRUARY XV.

OF BRUTES.

When we attentively examine the bodies of different animals, we discover many advantages which they possess over man. Many of them have bodies much stronger and more compact than those of the human species. Most of them at their first entrance into the world are capable of using all their limbs, of seeking for their food, and of following the instinct imparted to them by nature; and are not liable to the cruel sufferings which we experience in our infancy, and which so often injure our constitution. And what an admirable instinct and sagacity they display! What address and skill they exert in the use

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of their senses! How exquisite is their sense of smell! How piercing their sight! How rapid, how nimble, how active all their movements! How they speed and fly along! And if we consider the wonderful structure of some of their organs, the noble and majestic figure of some animals, we shall find, with respect to bodily perfections, we often yield to, or scarcely equal, many of the brute creation.

Some people are so weak as to complain that God has not given them the wings of the eagle, the force and speed of the fiery courser, the subtle smell of the dog, the eye of the hawk, and the agility of the stag. But such desires are the offspring of ignorance, of folly, and of presumption; of men, who do not feel that they possess a soul which enables them to soar far above these animals, and to make all their powers serve the convenience of man. Without mind we should indeed be inferior to brutes, which so far excel us in bodily powers; but they enjoy these advantages to enable them to live in the state allotted them without the reasoning faculty: for miserable indeed would have been their lot, did they not possess their present advantages; or were they possessed of reason, in a state of slavery, living only to be butchered, or to perpetually toil for the benefit of man.

We have here renewed cause to admire the wisdom and mercy of Providence, who has thus formed the brute creation. We see his wisdom in having given them instinct, sagacity, and strength, in a certain degree, proportionate to their necessities; and made all subservient to man: and his mercy is manifest in their entire ignorance of their situation. They possess all the pleasures they are capable of enjoying, but they cannot anticipate evil, nor think beyond the present moment: formed for this life only, they cannot in thought penetrate unknown regions, nor feel any pleasure but from the senses; whilst the mind of man finding nothing in this state of existence worthy to rest upon, reposes in confidence upon the certainty of a future state, where all its powers will shine with unclouded lustre.

FEBRUARY XVI.

OF THE MOON.

Of all the heavenly bodies, next to the sun, the moon has the most salutary influence upon our earth; and though her grandeur and beauty did not mark her as an object highly worthy of our attention, she would yet be so from the very great benefit she produces. With the naked eye we can discover several phenomena in the moon; we find she is an opaque body, with her luminous part always opposed to the sun, shining only by reflecting the sun's light; hence it follows that that side which is next the sun is enlightened, whilst the other half must be dark and invisible: when exactly opposite the sun she appears with a round illumined orb, which we call the full moon. By her continual changes we know that she shines with a borrowed

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light; for if the light was her own, being globular, we should always see her with a full round orb like the sun. She turns round the earth once in twenty-four hours, and finishes her complete revolution in about twenty-nine days and a half. But what we can observe by the naked eye is far short of what we discover by the aid of telescopes, and ascertain by nice calculations. How great are our obligations to those enlightened men who have extended the limits of our knowledge by researches and discoveries, which enable us to form more distinct and certain notions of the heavenly bodies! By means of their profound investigations we now know that the moon, apparently so small, is but thirteen times less than this earth; its diameter is 2180 miles, and its distance from the earth's centre 240,000. Upon the face of the moon several spots are discovered visible even to the naked eye. Some of these are pale and obscure, others more luminous, as they reflect more or less light. The luminous spots are high mountains, which reflect the sun's light from their lofty summits; and the dark spots are the transparent fluid bodies of seas, which from their nature absorb most of the rays of light, and reflect very few.* These discoveries, to which we can oppose no well-grounded objection, inform us, that the moon is a body much more considerable and of greater consequence than ignorant people have imagined. The magnitude, the distance, and all that we have hitherto discovered respecting this planet, afford us fresh proofs of the almighty power of the Creator. But can this vast body have no other use and destination than to illumine this earth during the night? Can this body, which in many respects resembles our world, and appears calculated to perform the same ends, and to which this earth itself serves as a moon, be created merely to produce the ebbing and flowing of the sea, and some other of the advantages we derive from it? Can it be supposed that the surface of a body some hundreds of thousands of square miles in extent should be destitute of living creatures? Would the Infinite Being have left this immense space empty and desert? We cannot reconcile such a supposition with the wisdom and goodness of God; let us rather suppose that he has established his empire in the moon as well as in our world, and that he receives aspirations of gratitude from millions of creatures who adore the same God, the same Father and Saviour, as do the inhabitants of this earth, and for the happiness of whom God has the same cares and solicitude as for us.

But as our knowledge upon this great and interesting subject must

*. As this opinion is regarded by some to be erroneous, it may be instructive to quote that of Mr. Ferguson, who says, 'Those dark parts of the moon, which were formerly thought to be seas, are now found to be only vast deep cavities and places which reflect not the sun's light so strongly as others, having many caverns and pits whose shadows fall within them, and are always dark on the side next the sun; which demonstrates their being hollow: and most of these pits have little knobs like hillocks standing within them, and casting shadows also, which cause these places to appear darker than others which have fewer or less remarkable caverns. All these appearances show that there are no seas in the moon; for if there were, their surfaces would appear smooth and even, like those on the earth.'—E.

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necessarily be limited, at present let us be grateful for the certain and known benefits we receive from the moon, in which the tender cares of Providence for man are evidently manifest. The moon is so near to us that we receive from her more light than from all the fixed stars together: by this means we have a noble and sublime object to contemplate, and receive incalculable advantages from its presence; since by its light we enjoy a continued day, and are enabled to travel in safety and with pleasure, as well as pursue many necessary occupations. By its means we can also exactly measure time, and through the medium of the almanack the vulgar are benefited by the abstruser studies of the philosopher. Lord Omnipotent! I adore thy wisdom and goodness in the light of the moon as in that of the sun. As I contemplate the heavens which thou hast formed, thy grandeur fills me with admiration and astonishment. May I, O Lord! lift up the eyes of my understanding to thee, far above all terrestrial objects! To thee who hast created all these magnificent globes, and wisely arranged them for our benefits. The starry heavens, which illumine the winter nights, announce thy majesty, and attest the infinity of thy empire!

FEBRUARY XVII.

RAIN FERTILIZES THE EARTH.

The fertility of the earth chiefly depends upon the moisture which it receives from rain and aqueous vapours. If the irrigation of the earth depended upon the care and labour of man, his toil would be unceasing; and with all his exertions he could not prevent the desolating effects of dryness and famine. Men might assemble and unite all their forces, they might exhaust their rivers and their fountains, without being able to supply the creation with a sufficiency of moisture to prevent the plants and vegetables drooping and perishing for the want of water. Hence we see how necessary it is that the exhalations and vapours should be collected and retained in the clouds, which, by the aid of winds, shower down fertility upon the ground, by refreshing and renewing the vigour of plants, trees and vegetables. The treasures so exuberantly teeming on the earth's surface are richer than the gems of Golconda or the mines of Peru; for we can live without gold and without silver, but without herbs and grain we could not exist. The advantages of rain are incalculable; it entirely renovates the face of the earth, and the furrows of the field eagerly drink the descending waters. The seeds develope their beauties, and the labours of the husbandman are rewarded. The farmer works, sows, plants, and God gives the increase. Man does all that depends upon his exertions, and what he cannot effect God executes; in winter he covers the seeds with a protecting mantle, and in summer warms and vivifies them by the sun's rays, and adds

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to their nourishment by rain. He crowns the year with his benefits, and causes his blessings so to succeed each other, that men are not only nourished and supported, but their hearts overflow with joy and gayety.

The showers fall upon the pastures of the wilderness, and the little hills rejoice on every side. The fields are white with flocks, the valleys are covered with corn; they shout for joy, they also sing. Bless then and rejoice in your Creator; by his order the seasons are renewed, and succeed one another with beauteous regularity. For us the rains descend, and the earth is clothed with fertility and verdure. God opens his liberal hand, and showers down blessings upon man; our countries receive them, and joy and gladness fill the earth. Let us then adore the Creator, and sing songs of joy and of praise to his honour and glory for ever and ever.

FEBRUARY XVIII.

OF THE SHORTNESS AND UNCERTAINTY OF LIFE.

We require frequent warnings to induce us to reflect on the shortness and uncertainty of life. Such remembrances are highly useful: for we have naturally a strong inclination to drive from our minds all ideas of death; and if that was not the case, there are always a thousand cares, and innumerable species of dissipation, which divert us from thinking upon our end, or which render such thoughts of little efficacy. It is, however, necessary often to reflect upon this state, which one day or other must arrive; and by frequently and duly contemplating it, we shall meet its approaches with firmness, and not sink overcome by fear. In this season of the year many images of death daily present themselves before our eyes. Nature, every where deprived of those beauties and fascinating charms which in summer delighted our view and filled our souls with pleasure; the fields, and the gardens, where we have so often walked with delight, and inhaled the gentle breezes that wafted over a thousand fragrant flowers, conveyed the sweetest perfumes and balmy airs, where every sense was joy, are now deserted, wild, desolate, and forlorn; nought is seen around but one wide waste of bleak sterility, where no verdure delights, no variety charms, and night usurps the day.

Perhaps this may be a just representation of some now flourishing in the pride of youth and the full vigour of intellect and gayety of heart; when old age shall weigh heavy upon them, and all their former vigour, cheerfulness, and alacrity shall have ceased; when the infirmities peculiar to that state, and a temper soured by vexation and disappointment, will no longer bear the amusements and pleasing society they formerly delighted in; and when they no longer possess attractions to render them agreeable or even supportable companions. The tedious and gloomy days of such an old age will be a burden,

from the oppression of which every rational being will long to be relieved. Though the days of winter are so short we have no reason to complain, since there are so few attractions to induce us to walk abroad in this season; neither should we regret that the period of life is of short duration, but rather consider it as a blessing, since its way is often strewed with thorns and beset with evils; and many have to drink of the cup of misery even to the dregs.

Many animals pass the winter in a profound sleep, from which they do not begin to awaken till they feel the mild and reanimating heat of the sun communicate vitality to their system. The long night of winter steals upon us unexpectedly in the midst of our occupations, and interrupts our labours; and here we may perceive a lively image of the night of death, which often arrives when least expected, and when least wished for. In the midst of a thousand projects and schemes of future felicity and of future grandeur, when perhaps on the eve of some great and important transaction, the cold hand of death presses on our eye-lids, and they are for ever sealed with darkness: when this solemn period shall arrive, may the thoughts and the actions which we are at that instant engaged in, bear the torch of truth to be applied: and may we not shrink from the trial! Thus we may continually derive the most useful and beneficial reflections from the changes effected by winter; and let us not fear often to contemplate those images of death, from which we may gain many essential advantages. Let us make ourselves familiar with the idea of our latter end, and let it in every situation of life come home to our hearts: we shall then be able to receive the awful messenger without dread; it will be a consolation to us in misfortune, a friend and faithful counsellor in prosperity, and a shield against every temptation.

FEBRUARY XIX.

PRINCIPLE OF COMBUSTION GENERALLY DIFFUSED THROUGHOUT NATURE.

During the long nights of winter, when the cold is intense, fire is a benefit which we cannot too highly prize or gratefully acknowledge. How comfortless and miserable we should be if combustible matters were not abundantly diffused through nature! They are contained in sulphur, in animal fat, in oils, in wax, in vegetables, in bitumens, &c. And though these substances appear inactive, no sooner are they ignited than they evince abundant activity and motion. Ignition may be performed by the collision of bodies having proper access to the air; thus with a flint and steel striking against each other, sparks are produced; and this is the ordinary way in which the fire we use for domestic purposes is obtained. But we are satisfied with enjoying the continual services that this element performs, without

troubling ourselves to inquire how it is produced. If we were more attentive to the causes of certain natural phenomena, we should every where find proofs of infinite wisdom and goodness. With the most beneficial views God has diffused throughout nature the principle of combustion in such a variety of substances, that we can convert it to all kinds of uses, and enjoy its useful power upon every occasion. Happy should we be if we only accustomed ourselves to pay more attention to the benefits we daily receive from the bountiful hand of God! But I fear it is their constant occurrence which renders us callous and indifferent to such high marks of Divine favour. And yet the proofs that we daily receive of the goodness of God are those which we can least of all pass by; they are such as most peculiarly deserve to be acknowledged with joy and unceasing gratitude. Let us then often reflect upon our wise and merciful Creator, and whilst we rejoice in his blessings, let us not forget the source from whence they flow, nor cease to remember that by again dispensing to less fortunate beings those benefits the goodness of God has enabled us to obtain, we most effectually render our gratitude acceptable to the Lord.

FEBRUARY XX.

EQUAL DISTRIBUTION OF THE SEASONS.

Though the rays of the sun now fall obliquely upon our part of the earth, and all our fields are under the influence of freezing winds, there are countries which enjoy all the youth of spring; others, where the rich harvest repays the toiling husbandman; and others, where the autumnal fruits luxuriate. So equally has Divine Wisdom regulated the revolutions of the seasons, and distributed to all his creation, at different seasons, the same blessings. His heavenly love is extended alike to all the beings which he has created, without regard to any particular country or people; it is sufficient for him that they require his assistance. The rays of his goodness shine upon the deserts of Arabia, as well as on the smiling plains of Europe; and either pole confesses his Divine regard. But if God has so equally distributed the blessings of this life, some will be ready to ask why certain countries are deprived of the charms of spring, whilst others are so abundantly favoured? Why the sun's rays are diffused so partially, that in some climates the nights as well as days continue for months; and why, towards the poles, the countries covered with ice are not as beautiful and fertile as our plains and valleys? But who are you that presume to ask such questions? What right have you to call on the Infinite God to account for the manner in which he regulates the world? Ye proud and presumptuous men, learn humility, and acknowledge the traces of supreme wisdom in those things which your want of intelligence makes appear a fault. Perhaps you

imagine that Providence has refused to certain parts of the earth the advantages and the enjoyments which are lavished, with a profuse hand, upon other more favoured climes. Such a supposition may accord with the confined views which some people take of nature; but they who are in the habit of grasping at a whole, and not resting content with a partial view of things, perceive and know that God has given to each country all that is requisite for the life, support, and happiness of its inhabitants. Every thing is arranged in the climate where they live according to their wants, and in a manner the best calculated for their preservation.

The length of the day varies in different parts of the globe according to certain rules; there is scarcely an inhabited country which the sun favours with his presence longer than another, only the times in which he is visible are different. The inhabitants of the torrid zone enjoy days and nights of an equal length, whilst those of the contiguous zones have this equality only twice in the year. Though the sun, by his annual course, gives winter to one country whilst another enjoys summer, he never fails to return again to impart his blessings; and if, during our winter, the days are not so long as the nights, the summer amply compensates for the difference: and though the inhabitants of the frigid zone are deprived of the sun's light for several months, they afterward enjoy it for months together; vegetation is rapid; and in the absence of the sun they enjoy a long twilight.

Where then is the country which does not receive the marks of Divine love? or the region in which the traces of a merciful Creator may not be discovered? Where is the being which does not experience the goodness of God in every season? or which does not rejoice to live under his dominion; and whose heart does not overflow with joy and gratitude for the numberless blessings shed abroad on the face of the earth? May we more and more feel our minds enlarged and our hearts warmed with that pure and heavenly love which the all-bounteous God of nature has for the works of his creation! May this happy feeling be the portion of every individual! And may we ever be found amongst the number of those who endeavour to know the Almighty, by imitating, to the utmost of their ability, in love, in virtue, and in true charity, the example of Him, whose sun shines upon the poor as well as on the rich—on the guilty as upon the innocent!

FEBRUARY XXI.

UTILITY OF OUR SENSES CONSIDERED.

Man is possessed of senses, through the medium of which he may acquire information and ideas of surrounding objects. Our eyes enable us to perceive different objects by the rays of light being re-

flected from them: by this means also we become acquainted with the difference of colours; by our ears we know the different sounds which vibrate on the air; by the senses of taste and smell different odours and properties of bodies become known to us; and by the sense of feeling we receive the sensations of hot and cold, of wet and dry, of hard and soft, &c. How miserable should we be if deprived of these senses! If bereft of sight, how should we be preserved from the dangers which surround us, or be able to provide for our support? We should no longer derive pleasure and improvement from contemplating the grand spectacle of the heavens, the beauties of the country, or the great objects of nature; and the delight we receive from the presence of our fellow-creatures, particularly of those whose mind-illumined face displays the culture of their souls, would cease. Without the sense of hearing we could not enjoy the reciprocal communication of thought; nor be wrapt into oblivion of care by the soothing sounds of plaintive melody, or excited to joy and to pleasure by more jocund strains. Without taste and smell we should be deprived of a thousand agreeable sensations, and should be subject to numerous inconveniencies; and without the sense of feeling we should be rendered incapable of arriving at any degree of perfection in the arts, or of providing for our necessities. We cannot then too much rejoice and bless God that we are enabled to see, hear, feel, and speak.

Let us then adore our Creator, and acknowledge and celebrate his goodness: let us offer up songs of joy and hymns of glory and of thanksgiving to the immortal God, and let our ears attentively listen to the harmonious voice of myriads chanting his praise. May we never despise or abuse the value of our senses, which have all been given us for the noblest purposes! How we should dishonour the liberal bounty of Heaven and the admirable structure of our body, if we only employed our senses in the pursuit of vain pleasures, or in the gratification of sensuality! Wretched and contemptible indeed is the man who has no higher delight, no more exalted feelings, than in sensual enjoyment; who is unacquainted with the exhaustless treasures of a cultivated mind!

The period will arrive when the pleasures of sense must cease, when the eye can no longer be gratified with the views of nature, the ear no longer receive the soft sounds of the flute, nor the taste be susceptible of its accustomed sensations. The time will arrive when all outward objects will no more interest or make any impression on the senses. How miserable then will be the lot of those who have basked in the sun during their youth, given themselves up to every species of sensual gratification, and neglected to prepare, by cultivating their minds, for the evil day, when their feeble and emaciated bodies are sinking beneath a load of infirmities, and when they will have nothing to rouse their mental energies, which have long since been annihilated, nothing to cheer and encourage their drooping spirits, nor any thing to satisfy their impotent desires. May we ever be enabled, through Divine favour, to make a proper use of our senses,

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and never lose sight of the great end for which we were created! Let us commiserate the condition of those unfortunate beings who are defective in their senses, and do all in our power to render their existence easy and comfortable; and by such conduct we shall best show our gratitude for the superior perfection we are blessed with.

FEBRUARY XXII.

THE SOUL BECOMES ELEVATED BY REFLECTING UPON GOD.

When we give up our hearts to God, we begin to answer the end for which we were created, and enjoy a portion of that felicity which is reserved for the blessed in Heaven. How contemptible and insignificant are all the amusements of the world, when our hearts have been rejoiced and ameliorated, and our minds expanded by reflecting upon God and Christ Jesus! When I compare my imperfections and inability with the infinite majesty of God, how little and humble I appear; how my pride is lost and confounded in the infinity of Divine Perfection! and how I long for the glorious period when I shall be more nearly acquainted with the everlasting God! But am I sufficiently impressed with the inestimable advantages which the frequent reflection upon God will produce, in order to give me firmness to employ myself in such a pleasing duty as often as I am required? Alas! instead of filling my mind with this great and sublime object, my thoughts too often ramble upon trivial and perishable subjects: instead of fixing my desires upon the meditation of Divine Wisdom; instead of loving and cherishing the bright essence and power of this Eternal Being, which unites every thing that is good, great, and amiable, and alone can make me happy; I perhaps feel no pleasure, but in the gratification of my senses; my affections are placed on terrestrial objects, and I only love things which are perishable, and which cannot contribute to my happiness. May my past experience render me more wise in future! Till now, I have only loved and set my heart upon temporal things, which are still more uncertain and perishable than myself.

But at present, through the grace of God, my eyes are opened; I perceive a Being which has raised me up out of nothing, which has given me a soul whose desires cannot rest short of eternity—a Being in whom every perfection and virtue are united, and to whom I will consecrate my heart, and devote myself for ever without reserve, and from whom I will ever receive all my consolation and delight. I will exchange those earthly enjoyments, which I have hitherto preferred to the blessings of Heaven, for advantages incomparably more real and permanently substantial. And though I still continue to make a proper use of the good things of this life, they shall never make me forget the love of God; but whilst I use them, and whilst I feel myself benefited by their good effects, when not abused, they shall serve

as a constant memorial of the goodness of God, and call forth my acknowledgments and grateful sense of his kind care and solicitude for my welfare. Whenever I partake of any outward good, I will say to myself, if I find so much sweetness in the enjoyment of earthly things, and being only acquainted with a very small part of the works of God, that knowledge is so delightful, how happy and glorious will be my state when initiated into the mysteries of Heaven, and favoured with a portion of the purity and perfection of God! How great is the felicity of the saints, who see him as he is, and live in the constant participation of his divine communion.

If those pleasures which can only be enjoyed through the medium of a frail and perishing body have the power of so agreeably affecting my mind, what must be its delight and ecstacy when, divested of all its fetters and impediments, it has winged its flight to the regions of bliss, and uninterruptedly enjoys the pleasure arising from its own workings; never wearied with thinking, nor injured by incessant action; but ever employed upon the sublimest images in the presence of the immortal God! If the gentle rivulets that so beautifully irrigate the earth are so pleasing, if a ray of light is so vivifying, how admirable must be the great Source and First Cause of the torrent of the rivers, the Living Fountain of all joy and excellence! how gloriously pre-eminent the Author of the blessed sun, the rays of which only have such great power!

From what we already know of God through his works, we may form some anticipation of the glory of futurity, and prepare with joy and with gladness for the happy moment, when the soul, released from its present dark and inferior abode, shall ascend into the heavens, and enjoy that purity and exaltation, the reward of those who, by the proper use they have made of their time here, are permitted to join the heavenly choir of angels in songs of ecstacy round the throne of the everlasting God.

FEBRUARY XXIII.

CAUSES OF THE VICISSITUDES OF HEAT AND COLD.

What occasions the transition from extreme heat to intense cold? By what means does nature effect these vicissitudes? It is certain that in winter the state of temperature principally depends upon the sun; for when our globe in its annual course round that luminary is so situated that its northern hemisphere is turned away from the sun, when the rays fall obliquely upon the earth's surface, and when the sun remains only a few hours above our horizon, it is impossible that its rays can be so powerful as when they fall more perpendicularly. But the heat does not entirely depend upon the distance and situation of the sun, which annually passes through the same constellations, and is not more distant in one winter than in another, yet the degree

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of cold varies very much in different winters. Sometimes a great part of the winter is as mild as autumn, whilst in another the deepest rivers are frozen, and men and animals are scarcely preserved from the effects of the cold. Even in those countries where the days and nights, during most part of the year, are of an equal length, the heat of the sun is too feeble to melt the ice and the snow on the summit of the mountains. On their heights reigns an eternal winter, whilst at their base verdure flourishes and summer smiles; yet the rays of the sun fall upon their ridge as well as in the valleys. From these circumstances it would seem as if the sun was not the only cause of heat, otherwise these phenomena would be inexplicable.

Nature is rich in resources, and a thousand causes of which we are ignorant may assist her operations. We know that the winds and the atmosphere have a great influence upon the heat and cold of a country. Hence it sometimes happens, that in the midst of summer, when the atmosphere is charged with vapours, the heavens are obscured by thick clouds, and the north wind blows, that great cold is felt; and, on the contrary in winter, when the wind is from the south, the temperature is often much milder. The peculiar nature of the soil may have some effect; and the winds blowing over the ocean acquire a higher temperature, which they impart to the earth as they sweep over its surface.

These causes, and, perhaps, many others we do not yet know, influence the temperature of the air, and produce the sudden alternations of heat and cold. In most of our investigations of nature we are obliged to stop short of the truth; and the most able philosophers have not been ashamed to confess how little they knew of her laws. We can comprehend but a very small part of her operations, and no doubt it is from the wisest reasons the Creator has concealed from our penetration the causes of so many effects which we view with wonder throughout the kingdom of Nature; but we know enough of them to be happy, wise, and content: let us endeavour to use, with propriety, the little knowledge we are permitted to acquire, and convert it to the advantage of our fellow-creatures, and the glory of God; for surely he did not give us our faculties to be buried in sloth and indolence, nor to be employed in trifling pursuits, or to become obliterated or perverted for want of cultivation and exertion.

FEBRUARY XXIV.

SINGULARITIES IN THE MINERAL KINGDOM.

From the limited nature of our understanding, it would be difficult, if not impossible, for us to comprehend, at once, the whole kingdom of nature, and to know and distinguish all the properties and qualities of her productions. We shall be facilitated in our search, and assisted in our inquiry, into nature, if we begin by the consideration of some

simple and detached objects, whose beauties will engage our attention, and whose peculiar phenomena will solicit our regard. At present, then, I shall consider some curiosities met with in the mineral kingdom, amongst which none are more remarkable than the magnet. When suspended, one of its extremities points to the north, the other to the south; these are called its poles, and they seem to contain the magnetic principle in greater abundance than the other parts. It does not appear to attract any other substance than iron, or the ores of iron: if you place the north pole of one magnet opposite the south pole of another, they will be mutually attracted; but if their similar poles, whether the two north or the two south poles, are placed together, they repel each other.*

Mercury offers to our consideration properties equally remarkable, and more useful. It is distinguished from all other metals by its fluidity, but it becomes solid when exposed to a sufficient degree of cold. In a heat of 600° it boils, and may be totally evaporated; exposed to the air and agitated, it attracts a portion of oxygen, and is converted into a powder called oxide, which is black, yellow, and red, according as the oxygen is in greater or less proportion. By the application of heat the oxygen may be extricated from the oxide, and the mercury again assume its original form.

Gold is the most precious and valuable of all metals, not only by its scarcity, but from its admirable properties. No other substance equals it in ductility and malleability. It may be beaten out into leaves so thin that one single grain of solid gold may be made to cover 56 3-4 square inches, the leaf being only $\frac{1}{282000}$ part of an inch thick; and an ounce of gold upon a silver wire is capable of being extended 1300 miles in length. It requires a very strong heat to melt it.

The curious crystals of salt; the peculiar brilliancy of some stones; the great variety of metals; petrified bodies found sometimes in the highest mountains; and a thousand more wonders contained in the mineral kingdom, are well calculated to awaken our curiosity and to excite our astonishment No pursuit is more gratifying and delightful, or more diversified, than the attentive contemplation of nature. Though we were to live for ages upon the earth, and employed every day and every hour in studying and investigating the phenomena and peculiarities of the mineral kingdom only, there would still remain a thousand things which we could not explain, but which, concealed from our penetration, would still more and more excite our curiosity. Let us then lose no time in entering such a wide field of discovery;

* The magnet does not appear to be a stone, as the author has represented, but iron only, or iron contained in stone, modified in such a manner as to admit the passage of the magnetic fluid; of which little is known, though some suppose it to be a modification of the electric power; to support which they assert, that iron long placed in an elevated position becomes magnetic; that instruments of iron struck with lightning are sometimes magnetised, and that two pieces of iron may be magnetised by rubbing them against each other in the same direction. But supposing it was the electric fluid undergoing a peculiar change in the iron, we are still no nearer the moon; for we are equally in the dark respecting the nature of an electric as of a magnetic fluid. It is their effects only with which we are acquainted.—E.

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let us employ a part of the time we can spare from our indispensable duties and avocations in observing nature, by which our mind will become improved, our knowledge increased, and we shall be rewarded with a very innocent and durable pleasure. The more we meditate upon the designs of God in his works, the more will our satisfaction increase, inasmuch as the objects of nature are infinitely more sublime and wonderful than the choicest productions of human genius.

FEBRUARY XXV.

GOD'S LOVE FOR MAN DAILY MANIFESTED.

To enumerate all the blessings which the mercy of God has bestowed upon us from the first moment of our existence to the present period, would be as impossible as to stand upon an eminence and count the stars of heaven. How many benefits have we received in our infancy, which are now entirely forgotten! From how many dangers, open or concealed, have we been delivered! From how many impending evils have we escaped; and how often has God provided for our wants, and confounded the incredulity of those who regarded assistance as hopeless! Each day of our lives add to the sum of the favours we received. Each time that the sun illumines the eastern horizon, and that his departing beams leave a radiance of glory in the west, the goodness of God is manifested. And what greater and more striking proofs can we have of his Divine love, than our being redeemed through the sufferings of Jesus Christ! that we have the Holy Scriptures of truth to point out those certain rules, which lead to life and to happiness! and that from our earliest infancy we are permitted to imbibe the pure principles of Christianity, safe from the machinations of bigotry and the terrors of persecution!

From these considerations it will appear to be wholly impossible to number the blessings we receive from God. Let us confine ourselves to a single day, and endeavour to compute the mercies we receive in that short space: light, air, food, strength, a habitation, and friends, amusements and pleasures, and the renewed powers and activity of the mind, with a thousand others each individual may enumerate.* May our minds be impressed, and our hearts softened, by these daily instances of God's love; and by frequently meditating upon them, may our gratitude be elicited, and our virtue strengthened and improved! The more we employ ourselves in such reflections, the more we shall be disposed to reverence the power of the Almighty, and be delighted in celebrating his praise.

* The author calculates that 'we receive from God 12 blessings every minute relative to respiration; 30 relative to our understanding and will; and 6000 relative to the different parts of our bodies: consequently God grants us, each minute, 6042 blessings, and 362,520 every hour of life.'

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FEBRUARY XXVI.

TRANQUILLITY OF THE NIGHT.

The care of Providence to secure our repose during the absence of day, claims the utmost gratitude and admiration. When night spreads her sable mantle over the earth, a universal stillness reigns, and announces to all creatures a cessation from their toils, and invites them to soft repose. To aid this general calm, nature suspends the action of those things which, by their vivid impression, would interrupt its duration. Animals, whose restless activity might disturb our sleep, have themselves need of repose; the birds retire to their nests, and the domestic animals sleep around us.

But this dead calm is not alike agreeable to all; for many who, from pain, sickness, and various causes, pass their nights in dreary watchfulness, oppressed with care, no sooner lie down, than, preyed upon by distracting thoughts, their sufferings and their troubles seem to augment in proportion as every thing is tranquil around them: they count the hours as they slowly pass, and the time drags heavily till the first streaks of morning break, and the cheering rays of the sun restore to them the presence of pleasurable objects, and the intercourse of their friends. The number of these victims of disease and mental distraction are few compared with the great mass of mankind, whom health of body, ensured by temperance, and peace of soul, obtained by good works, always procure sweet and uninterrupted slumbers. After the fatigues of the day, we hail the approach of evening with pleasure; and as the gloom thickens, and spreads a deeper shade, we feel the influence of sleep gradually diffused over our frame, and stretched along at ease on the downy couch, soon confess its grateful power. But how often does man break in upon the midnight hour, and disturb the general calm of nature! The tumultuous uproar of the drunkard, and the wild levity of the libertine, often trouble the repose of the peaceable, and interrupt their slumbers. Can these thoughtless beings ever reflect upon their general disturbance of the peace, or have any respect for the ordinances of God! At the very hour of their heedless noise, and riotous mirth, they are, perhaps, rendering more distracted the last moments of some poor helpless creature that imagines a short repose might ease her agony, or they break the slight repose of some unfortunate person who has long solicited it in vain. 'How happy are the true believers, who have passed through the sleep of death to their God! They are released from all the miseries and vexations of a life passed in continual dangers and alarms, and their repose is no longer disturbed by numberless pains and anxieties! Freed from all misery, their souls no more shall be oppressed by grief, nor their joy be exchanged for sorrow and bitterness; but blessed in the Lord, their peace shall be perfect.'

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FEBRUARY XXVII.

WINTER IS AN EMBLEM OF LIFE.

During the winter days we experience a continued succession of vicissitudes; flakes of snow, showers of rain, clouds and sunshine, storms and calms, quickly follow each other. Scarcely has the snow enveloped nature in its pure veil, when it vanishes from our view; and scarcely does the sun reveal his splendour, when he becomes obscured by the dark clouds. So in the moral world we witness as frequent variations. If, during winter, many days are dark, gloomy, and dull, so also are many of the scenes of life; and as storms and darkness are necessary and conformable to the wise laws of nature, so also adversity will strengthen the mind, and render better the heart of man.

Who can prevent the day from being darkened by clouds, or our happiness from being the sport of contingencies, and at the mercy of other men? It is as impossible for our souls to enjoy an uninterrupted calm, as for the face of the heavens to be continually smooth and serene; and as impossible for our frame to be free from pains and accidents, as for the air to remain always destitute of clouds. Passions which often produce good effects will, likewise, sometimes occasion the most fatal consequences, and may be justly compared to the storms and tempests which perturb the face of nature. And as the winter is a source of fertility to the earth, so the afflictions and hard treatment we sometimes experience may be a means of increasing our wisdom and our virtue. Darkness teaches us how to esteem and value the presence of light, the continued brightness of which would dazzle and fatigue our sight; and a fine serene day never gives us more pleasure than when it is preceded by gloomy and tempestuous weather. Neither should we be so sensible of the blessings of health, if we had not learned its value by painful experience.

We are in general too apt to exaggerate our evils, and magnify our sufferings; the events of the world, and the accidents of life, are rarely so lamentable, as in the gloominess of our thoughts, and the ardency of our imagination, we represent them. We are so blinded by pride, self-love, and affectation, that we consider every little evil that befalls us as of the first consequence; whilst we never think of the many advantages and comforts with which we are favoured, and which far exceed the trifling inconveniences we may suffer. Even what we regard as the greatest evils may be converted to our ultimate gain, if we conform ourselves to the views of Divine Wisdom. Do we not see the snow, the tempests, the winds, and the frost, and all the changes of the season, are the means which God uses to grant us new favours! When the sky has long been lowering, and the clouds gathered thick, when the storm and the tempest have threatened, how soon has light been restored to the heavens, and joy and gladness again smiled on the earth! The heavier the showers are, the sooner

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the clouds are drained; the more intense the darkness, the greater is the pleasure when the sun restores the day. Adversity only fills up a part of our life, and often when the storm threatens to break over our heads we are going to be relieved from our trouble.

Let us, therefore, bow without murmuring, to the dispensations of Providence, and cheerfully submit to the evils we cannot avoid: if it please the Almighty Disposer of events, that our path through life shall be dark, with few rays of comfort and of happiness to cheer us on our gloomy way, let us not repine; but steadily hold on our course, unmoved by the laugh, the scorn, and the censure of the world, as the rock rears its head above the waves, and remains regardless of their idle foaming, whilst the storm rages around.

FEBRUARY XXVIII.

THE UTILITY OF MOUNTAINS.

Would it be more advantageous to our globe if the surface were more even, and not subject to so many inequalities? If the superficies of the earth had been smoother, so as to form one vast extended plain, might not our sight have reached farther, and our travelling from place to place been more facilitated, besides many other advantages which we should have experienced? These are important questions, and deserve our serious consideration: let us now, therefore, see whether we have any cause to be discontented with the present arrangement of our globe.

From mountains and hills flow innumerable springs, which uniting, form vast lakes and rivers. Those immense chains of mountains which extend from east to west, traversing a great extent of country, are supposed to condense into water the moist exhalations from the earth, and thus prevent their being dissipated: from the summits of the mountains there is thus a perpetual supply of streams, which descend to irrigate and fertilize the valleys below.

Besides their being the source of fountains and rivulets, they are also of great use in being the abode and shelter of many animals which are of great advantage and service to man. They supply, without its costing us any labour, food and support to many animals, which we esteem both for their flesh and their skins. Upon the sides of mountains grow and flourish trees, plants, and a variety of herbs and salutary roots, which cannot be so well cultivated in the plains. Within their bosom, also, are contained various metals and minerals; and mountains are highly useful in sheltering us from the cold piercing blasts of the north and east winds; and to many countries they are more effectual and durable barriers against the inroads of hostile nations than the strongest ramparts and most powerful engines of war; and they are, at the same time, the most sure bulwarks against

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the ravages of the sea, the inundation of floods, and the devastation of the winds.

They form the most grand and striking objects of nature; for who can contemplate the Alps, the Cordeliers, and the Andes, without feeling emotions of sublimity? or view, without astonishment and rapture, Plinlimmon and Benlomond, whose summits are lost in the clouds? It is true that some mountains, such as Ætna and Vesuvius, are terrible from their explosions, and dreadful from the materials they contain; causing horrible shakings of the earth, and hurling fire and destruction far around. But as we have reason to believe this partial evil is for the general good and advantage of man, we have no cause to complain of this peculiar arrangement of the earth.

Mountains, then, we find, are essential to the due preservation of the earth; procure us numberless advantages; and display, equally with the rest of the creation, the wisdom, power, and goodness of God. On the heights, as well as in the depths: on the mountains, and in the valleys; above the earth, as well as beneath it; the Lord manifests himself the benefactor of his creatures, and gives occasion to bless and celebrate his name for ever and ever.

MARCH I.

POWERS OF THE MIND ENLARGED BY CONTEMPLATING GOD IN THE WORKS OF NATURE.

Let those who wish to worship the God that made the heavens and the earth, go forth and view his works, and see, and acknowledge with gratitude, the wonders he has wrought. Of all the species of knowledge we can acquire, none is more important, more agreeable, or more interesting, than that we gain from studying the works of nature; and, properly to answer the great end for which we were created, it is essential to become acquainted with the Divinity by considering his works: it will ensure us present as well as future felicity. It is certainly right to seek for a knowledge of God, as revealed in his divine word: but we shall scarcely embrace, with full conviction of heart, such a revelation, if we do not join to it that other revelation by which he is manifested to us in nature as the Creator of all things, and as the common Father, Lord, and Benefactor of the creation. And we find our blessed Lord and Saviour Jesus Christ, when opening to his disciples the great truths of religion, often made mention of the works of nature, and conducted his hearers from a consideration of the subjects which the moral and physical world present, to the meditation of things spiritual and heavenly.

The frequent study of the great volume of nature is sufficiently noble, and worthy the attention of man! By it we learn those truths which declare to us the immense grandeur and glorious attributes of God; we are taught to know, and properly estimate, our own limited

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powers and faculties, and become better acquainted with the obligations we owe for the blessings we receive. Those who despise this study, and think it beneath their notice, only draw down upon themselves shame and disgrace, and deserve the compassion of their fellow-creatures. The advantages of reason are never more felt than when our faculties are employed in meditating upon the perfection of God displayed in his works: never does the mind so expand, and the imagination take such bold flights, as when, ranging abroad through nature, we view her works, whether the constellations and the luminaries of the heavens; the hills, and the distant mountains; the wide extended valleys, the groves, and the meandering streams; or listening to the sighing of the wind, or the hoarser cadence of the swelling wave, now foaming beneath the hoar cliff, or vainly breaking against the rock, whose dusky top sullenly peers above the spray; and, glowing with rapture, our soul then feels there is something more than all this; sensations arise too sublime for utterance, and we are immediately brought as into the presence of God: all meaner things, in those glorious moments of true delight, find no place in our bosom, which is filled with ecstacy and inexpressible felicity. These joys are not like the pleasures of the world, fleeting and transitory, but they are ever fresh and ever young; they never disgust with satiety, nor weary with reiteration: and when retired to our habitations, the mind formed for greatness, instead of being occupied with the trifles and frivolities of the day, looks back with fond delight upon the past scenes, which the imagination depicts in the purest and most glowing colours; and, safe from the dangers of his voyage, the traveller remembers the objects which once forcibly arrested his attention.

We cannot long be in the habit of thus exercising our faculties without their being much benefited and improved: whatever calls forth the powers of the mind tends to elevate and enlarge its capacity: and nothing contributes more to this noble purpose than the study of nature and of God: from our imagination we receive our greatest pleasures, and it never takes higher nor more brilliant flights than when ranging through nature; but we have reason to believe, that the power we are permitted to enjoy of obtaining a degree of pure happiness here, is not to be annihilated or lessened when the soul is released from those incumbrances which now so much shackle and retard her advancement in wisdom and in perfection; but that this kind of pleasure and true enjoyment will be continued in a future state; and he who has most cultivated the faculties of his mind and cherished the virtues of his heart will have these faculties increased according to his desert in the world to come, where we are told in the language of Scripture, saints and angels of light continually rejoice in the presence of God, and are never weary with contemplating his glory and hymning his praises. And such even in this world is the reward of those who are continually reflecting upon the Almighty Power, as manifested in his works.

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MARCH II.

UNPLEASANT WEATHER.

Nature is still drooping; deprived of her beauties, her aspect seems wild and dreary; the sky is obscured with clouds, and the atmosphere loaded with vapours. A thick fog conceals the morning sun from our view, and prevents our receiving his salutary influence; his warmth is feeble, and scarce a solitary herb peeps above the ground; all is dull, lifeless, and without charms. Some will be ready to exclaim, When will the lovely spring appear: When will those happy days arrive when the first flowers shall invite us forth into the fields and the gardens? But let us remember that before these pleasing effects can take place, such a state as we now experience must occur. Such is the plan of nature, that without these days, which we think so disagreeable, all our hopes of summer must vanish. Storms and tempests are beneficial, and frosts ultimately tend to fertilize the earth. If the air was now mild and more temperate, millions of insects would be generated, to the great injury of the seed which is sown, and the plants ready to bud. And if the weather should now be mild, and blossoms be put forth, how they would suffer should a frost return to nip the tender shoots!

Yet such is our blind obstinacy, that we murmur against God when we ought to adore and to bless him; and we set down for imperfect what should make us acknowledge the wisdom and goodness of the Creator. In short, we know not what we ask, nor what we desire; and it would be a sufficient punishment if all our prayers were to be granted. It is for the wisest purposes that the approaches of spring are gradual. The frequent rough and boisterous weather of March is generally the last remains of winter, prepares us for the enjoyment of finer days, and is the forerunner of the delightful verdure which the spring spreads over our fields. Therefore, O my God, will I continue to exalt and to bless thee. In these stormy days I will be more and more convinced that thy government is wise, and thy arrangements of nature just and beneficial; and that in all times and in all seasons, in storms, and in calms, in the rain and in the snow, equally as in the finest weather, thou art still my Father, Preserver, and Benefactor.

MARCH III.

STATE OF CERTAIN BIRDS AND ANIMALS DURING THE WINTER.

At present we do not see any of those insects and birds which, during the summer, float by millions in the air and in the water, or rest upon the earth and among the groves. Of the birds, some species a-

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the approach of winter disappear, and retire to climes of a higher temperature, where they can find shelter and nourishment. The first stormy day is the signal for departure; when, quitting their abodes, they assemble, and prepare to wing their flight to far distant countries. Nor do those that remain behind perish; they continue through the rigours of the season. The bodies of some animals are so formed, that the same causes which deprive them of their food occasion such a change in their system, that they do not require any aliment; the cold affects them to such a degree that they become torpid, and seem as if wrapped in the profoundest sleep, which continues till returning warmth opens the earth, and it again brings forth fruits; when they awaken from their slumbers, and, as the spring advances, leave their retreats in the sands, in holes of the earth, the hollow trunks of trees, marshes, and various other places that have sheltered and protected them in their death-like state during the winter.

How admirable is the wisdom of God, whose tender cares extend to the least of his creatures! He has endowed each of them with an astonishing instinct, which enables them to continue and to preserve their existence; teaches them the day when they are to abandon their summer abodes, and pass the time of our winter in more genial climes; and directs them in their dangerous flights. To others it points out the places where they may pass their time of torpescence in safety; and when the warm beams of the sun descend with sufficient force, they come forth unhurt.

Each time that I reflect upon these changes, I am induced to think of what will happen to myself at the hour of death; when in that solemn moment I shall leave my habitation, my dearest friends, and all my pleasures, to pass into another state of existence. The changes that these animals undergo offer me another edifying reflection. I see how God watches over the smallest link in the vast catenation of beings; I see with what paternal care he provides for the support and preservation of the weakest and most insignificant creatures: and it would not be inconsistent with my ideas of his wisdom and bounty to imagine that he would have less regard and solicitude for my welfare and conservation, whom he had been pleased to create so much superior? Surely that God which clothes and nourishes the insects and the birds, which provides them with retreats and places of repose in the holes of the earth and in the clefts of rocks, and guides their course to distant countries, will never abandon me in the time of want and of danger, nor forsake me in the hour of my affliction and distress.

MARCH IV.

WINDS AND TEMPESTS.

How violently the air is agitated! Hark, how the wind whistles above, and now swells in a louder blast! See how the dark clouds

gather, and then whirl along with fearful swiftness! The uplifted oaks strew the ground, which shakes as they fall; and see those wretched huts borne aloft by the blast, their scattered fragments tossing in giddy eddies! The clouds open, and deluge the earth with the descending torrent. Perhaps at this moment some luckless bark is riding in the storm at the mercy of the winds: above, the loud blast roars, and all around is darkness; the waves now meet the clouds, then roll back, and discover the gulf threatening instant destruction. The fear-struck mariners have now no hopes; they think of their far-distant homes, and with wild horror view the wave, in which, as it rolls on like a vast mountain, they read their final doom. But why does the beneficent Creator thus permit the winds to track their course over the seas and the earth with desolation and destruction? Mad question! Who has the temerity and the arrogance to dare to censure and pronounce judgment upon the Almighty, or to question his proceedings? Let us rather consider his ways in silence, and feel persuaded, from what we know of him, that they are always beneficial.

Though the tempest and the whirlwind often speak in terror, and shake the earth; though they cause devastation, and make the ships on the seas to be splintered against the rocks or entombed in the deep; though houses are overthrown, and men and animals are swept away: still we have no right to arraign the decrees of Providence, which are written in wisdom and uttered in mercy. These storms and tempests are to answer great and important purposes in nature. At the return of spring, a humid and mild air softens the earth, which, during the winter, had remained hardened. By this change of temperature the atmosphere often becomes charged with noxious vapours, and plagues and contagion might destroy men and animals, if these violent agitations of the air did not render it more pure and salubrious.

Thus we find the Almighty, whether he visits us in tempests, or smiles upon us in serenity, is alike the Father and Benefactor of the creation; and every time we hear the winds blow over our heads let us acknowledge his goodness, and reflect with gratitude on the wisdom of his government. The Lord taketh the winds from the four corners of Heaven, and bringeth them from the extremities of the earth; he marketh out the paths through which they should proceed, regulates their boundaries, and bids them to cease when they have fulfilled his purpose. Why then should we fear or be troubled when his messengers execute his commands? Though the tempest should howl around me, the earth tremble, the rocks be rent in twain, and darkness obscure the face of nature, I will not be disturbed, neither will I be terrified; but I will put my trust in the Lord, and rest my cares upon the bosom of Him who rules and governs the universe, who directeth the winds, and pointeth out to the stars their course.

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MARCH V.

AURORA BOREALIS.

Sometimes in winter and towards the vernal equinox, we observe in the heavens a sort of transparent, luminous, and diversely coloured clouds. A brilliant light appears from the north, which is gradually communicated to the other clouds, till at length rays of pale light shoot from these northern clouds towards the zenith. This aerial phenomenon, called Northern Lights, or Aurora Borealis, may be classed amongst those natural effects the true cause of which we do not exactly know. Some naturalists have supposed it to be a magnetic matter, which, accumulating towards the north, becomes luminous. Others with greater probability, suppose it to be occasioned by the rays of light falling on clouds or mist, and thence reflected.

The uncertainty in which we are with respect to the cause of this phenomenon may be made useful to us. How many things do we not see in the heavens and on the earth which the greatest philosophers cannot explain? This ought to render us humble, and check that pride which is continually raising us in our own estimation, and teach us that many very inconsiderable things often confound the wisest amongst us in their investigations, and elude their most attentive research. There are innumerable objects that we acknowledge are arranged with wisdom, and perform the most useful offices, with whose true principles, end, and catenation with the material world, we are unacquainted. Happily this ignorance does not always affect our happiness; for though we cannot exactly determine the cause of the Aurora Borealis, our peace of mind is not therefore destroyed, nor our comforts diminished. And however ignorant we may be of that and much more, we are yet so far favoured as to know that all the phenomena of the physical as well as of the intellectual world proceed from an all-ruling Providence, which governs the universe with wisdom, and directs it with harmony and love. Those who rightly feel this truth will have sufficient cause to bless and to adore the Almighty, as well as objects enough to engage their attention and exercise their faculties during their short passage through this life. Let us be moreover thankful that we were not born in those ages when ignorance ruled and superstition triumphed; when, upon the appearance of such a phenomenon as we have just described, whole nations trembled and were thrown into consternation. This beautiful spectacle presented to their troubled imagination armies opposed to each other, and dreadful battles fought in the air; whence they prognosticated the greatest evils. The Aurora Borealis was to them the evil genius which proclaimed war, famine and pestilence; and terror and dismay spread through the country.

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MARCH VI.

POWER OF GOD DISPLAYED IN THE MINUTEST OBJECTS.

The azure vault of heaven, the immensurability of space, the constellations in the firmament, the variety of creatures which inhabit the earth and fill the air and the waters, all display the glory and announce the infinite power of Almighty God. But it is not alone in the great objects of nature that we trace the wisdom of the Creator; it is equally conspicuous in the least of his works. A single grain of sand viewed through a glass which magnifies a million of times will excite the greatest astonishment; and who would not be surprised to discover that an insect lives within it?* Even in our own body we can discover objects inconceivably small and well deserving observation; every where on the surface of the body are innumerable pores, a very small part of which can be discovered by the naked eye. The epidermis resembles the scales of a fish, and it is calculated that a grain of sand will cover 250 of these scales, and that one of these scales can cover 500 of the interstices or pores through which the insensible perspiration passes.

Have you ever considered the wonderful structure of the hairs of your head? They are hollow tubes; each of which has a bulbous root, a marrowy substance, and connecting filaments. Every thing ought to convince us that there are thousands of objects in nature which are wrapt in mystery, and that we have many discoveries to make of things at present entirely unknown to us. There may be a thousand wonders in the formation of our body of which no person has yet thought, and which he would be far from suspecting: and there are some organs existing, the use of which we do not yet know. And how many objects may there not be in nature, so minute, that the microscope cannot detect, nor the understanding conceive them; but which, if known, would furnish new proofs of the grandeur of God! The little that we do know is sufficient to convince us that his power, wisdom, and goodness, in small things as well as in great, are most admirably manifest.

The sands of the sea, as well as the expanse of heaven, the brilliancy of the stars, and the roaring of the tempest, declare the glory of the mighty God. The trees in the beauty of their foliage, and the least grain and seeds in their abundance, cry with one voice, It is God who hath made us, give all glory and honour to the Creator! And to him, and him only, ought we to give glory. The smallest of his creatures display his power: the structure of a fly is as curious as that of an elephant; a single blade of grass as that of the stately oak; and the formation of a grain of sand is as wonderful as that of

* The author very gravely asserts, that 'if you examine a crumb of mouldy bread through a glass which magnifies some millions of times, you will discover a thick forest of fruit-bearing trees, whose branches, leaves, and fruit, may be easily distinguished!'—E.

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a mountain. No creature that he has formed is unworthy our attention; those which we consider as the most despicable, contain wonderful properties; and as God has condescended to create them, they are certainly worthy our esteem and regard.

MARCH VII.

THE EFFECTS OF WINTER GRADUALLY DEPART.

The same wisdom, which, at the beginning of winter, caused the increase of cold to be gradual, now orders its departure so, that it diminishes by degrees, and the rigorous season insensibly verges towards an end. The sun remains longer above the horizon, and his rays act more powerfully upon the earth; flakes of snow no longer obscure the atmosphere, and the nights only produce a white frost, which vanishes before the noon-day sun. The sky becomes serene; the fogs and vapours either disperse or are converted into beneficial showers. The earth is rendered soft and pliable, and imbibes moisture; seeds begin to open out, branches which appeared dead, put forth tender buds, and the blades of grass spring up out of the earth. We see nature universally preparing to restore verdure to the fields, leaves to the trees, and the long lost flowers to the gardens. Notwithstanding the tempests, the hail, and the yet frosty nights, she is silently labouring to bring back the spring; she will soon put off her sad and gloomy aspect, and resume all her charms and fascinating beauties, laughing with youth and gayety.

It is thus that all the changes in nature are gradually accomplished. Each effect that we perceive has been preceded by some exciting cause; a thousand circumstances which escape our notice succeed each other, until the great designs of nature are completed. Many springs are put in motion before a single blade of grass can spring up or one bud be unfolded. All those changes which have so unpleasantly affected us during the winter were necessary to ensure us the smiling prospect that so soon promises to open before our delighted view. Tempests, rains, frost, and snow, were requisite, that the earth might repose, or undergo that state by which its powers are renewed and its vigour repaired, to enable it to sustain a greater degree of fertilization. Now that the advantages of these arrangements of nature begin to unfold, and we discover some of the ends they were destined to fulfil, we acknowledge their propriety, and the beneficial consequences of winter demonstrate to us its great utility to the earth.

As the seasons continually vary, so also do the periods and events of our lives continually change. In the life of each individual there is a catenation of causes and effects, which will remain wrapped in mystery, till eternity shall lift up the veil, and show why certain events were necessary and beneficial to our condition. Perhaps we are unable to know why we happen to be born in a particular family,

and in a certain place rather than another; why certain accidents have befallen us, or why we embraced some particular mode of life in preference to another: all which at first might be hidden from us; but now we comprehend that one action was a consequence of another, that the past was necessary for the present, and that many events which did not seem to accord with the plan of our lives were yet essential to the happiness we now enjoy. We are hourly approaching that period when all the events of our lives, and the secret springs and causes which operated to produce them, will be made known to us; and perhaps we are at this moment upon the eve of taking our flight for the regions of futurity, which, according to our deserts, will be happy or miserable. O God! influence my heart to believe, that so it may be filled with peace and joy; and when the visible creation shall depart from before my eyes, grant that I may enter into a blessed eternity; and permit me to enjoy such a foretaste of it as shall elevate my soul above every earthly and perishable thing!

MARCH VIII.

THE EXTERNAL PARTS OF THE HUMAN BODY.

While the beauty of nature is veiled, and the fields and the gardens have not yet gained those charms which fascinate and invite to enjoyment, let us consider the structure and formation of the human body, which will furnish ample cause for admiring the power and wisdom of God.

Amongst the most remarkable and conspicuous parts of the body is the head, whether considered as to the beauty of its form and appearance, or as the supposed centre of sensation and seat of the mind. The organs of sight, of hearing, of smelling, and of tasting, are all placed in this wonderful part; and upon the face, where shines every beauty, all the movements of the heart, all the feelings, are portrayed; the secret sentiments of the mind are legible, and the passions of the soul displayed. The lips, as they move in smiles, or assist the tongue in giving harmony and diversity of tone to the voice; the teeth, as they add to the beauty of the countenance and divide and comminute the food; with the different glands in the mouth, which secrete the saliva so necessary to digestion; are all admirable, and wonderfully formed. The head, from its peculiar articulation with the neck, is capable of turning in any direction; the shoulders are constructed in a manner which gives the greatest degree of strength of which a form like ours is capable; to them are attached the arms, and to these the hands, which are formed with exquisite wisdom; we are enabled to perform by their means an infinite variety of motions; their peculiar structure is one great cause of our superiority in the arts, and all their movements are facilitated by their numerous bones and joints.

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The chest forms a bony cavity, in which the heart and lungs securely perform their functions. The diaphragm separates them from the abdomen, which contains the stomach, the liver, the spleen, the kidneys, and the intestines. All this mass is supported by the hips and lower extremities, which have various joints to facilitate their motion; and lastly, the feet contribute very powerfully to this important purpose. The whole body is covered with skin, beneath which are muscles, with which we are enabled to perform our various motions; and we find, in some parts, a luxuriance of hair, which much adds to the beauty of the whole.

What a diversity we see in these different parts! and yet they are only some that are the most conspicuous, for there are many more equally essential. Their form, structure, order, situation, movements, and harmony, all display their divine origin. No part of the body is imperfect or useless, and the least alteration in its present organization disturbs its regularity and interrupts its functions.

If we only consider the consequences of being deprived of our hands, or having them formed like the hoof of a horse, how helpless we should be, incapable even of providing for our most urgent necessities, we should admire and rejoice in our present happy conformation. If we possessed the ratiocinative faculty with the form of some quadruped or reptile, how incapable we should be of exercising those arts and employments which we now perform! or had we, like the fabled Cyclops, but one eye placed in the middle of the forehead, how impossible to see objects on the right or on the left, and how confined would be our view! or if our ear was differently situated, how imperfectly we should distinguish sounds! We should be perfectly satisfied that the present organization of our body is best adapted for our condition in life, and we should bow down with reverence and gratitude before the throne of the Almighty, who has thus so wonderfully formed us; who has given us senses, which, however excellent from nature, may all be improved by cultivation; and a mind, the expansibility of which seems to be unlimited. Seeing then that it depends upon ourselves whether our mind is to be luminous and our senses acute, or whether it is to be contracted and they brutified and callous, let us pray to the God of nature that we may never lose sight of these truths, nor ever neglect improving those talents which, in his infinite mercy and condescension, he has entrusted to our care. Let us take the greatest care and make the noblest use of our bodies, seeing, that after they shall have reposed a certain period in the grave, they will be restored to us infinitely more glorious and perfect. It behooves us then not to dishonour a body which will be so illustrious in a future world, conformed to the glorified body of our Lord. Let the blessed and glorious hope of our future bliss, from this moment, animate us to dedicate our bodies to holiness, to regard them as the temple of the Deity, and preserve them pure and blameless till the glorious coming of Christ Jesus.

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MARCH IX.

HOPE OF SPRING.

Every day hastens the approach of spring, and our hearts begin to throb with the pleasurable hope of soon seeing the happy time arrive, when we can inhale the balmy breeze, and, walking forth into the fields, see all nature rejoice. This sweet expectation is one of the few which does not deceive, because it is founded on the invariable laws of nature. The charms of this fond hope are alike diffused through every pure heart: it is not the splendour of the purple, nor the glittering of the diadem, which alone procure these delights, that often cheer the peaceful breast of the cottager, who cannot penetrate the abode of royalty, nor find entrance amid the busy sons of traffic. The arrival of spring is attended with a thousand new delights; the beauty and fragrance of the opening blossoms, the warbling of the birds, and the widely diffused joy and gayety that smile around. In general our terrestrial hopes are damped by anxiety and repressed by doubt, but the hope of spring is no less certain and satisfactory than it is pure and innocent. Let us, then, whilst the stormy days of March shall continue, instead of repining and being chagrined, indulge the fond hope of spring, and suffer its pleasing influence to cheer our souls.

Hope is one of the choicest gifts which Heaven mercifully deigns to mortality; when the storms roar and the tempests howl, hope still supports our drooping spirits, and the rays of consolation gladden our hearts. Without this pleasing emotion how sad and dreary would have passed many of the winter hours! Cheered by the hope of spring I have borne with patience, and endured without complaint, the rigours of winter and the hardships of the season, and now I am upon the eve of seeing it realized: a few more boisterous days passed, and all the beauteous pictures my imagination has so brilliantly painted will be confirmed; the sky will become serene, the air mild, the sun return with power, and the earth resume her long-lost beauty. Gracious God! I humbly thank thee, and bow before thee in the fullness of my joy and the overflowing of my gratitude, for the source of that consolation, which, in the hour of distress, warms my heart and softens the asperities of life. With what providential care and merciful regard thou hast veiled the evils which hover around me, whilst the pleasures which await me are seen far off, and smile upon my exertions!

Without hope, how dreary would be the world; appearing to the care-worn pilgrim one wide desert, all the paths of which are surrounded with misery, beset with trouble, and embittered with sorrow! But hope lights us on our way; when darkness lowers and gloom oppresses, hope strengthens our faltering steps, collects our scattered senses, and presents to our view a pleasing prospect lying before us and just within our reach; we spring forward with alacrity, and often

pass our lives in the eager pursuit, with as much pleasure as if we had obtained the object of our wishes. Hope raises the sinking heart, and restores the courage which begins to droop; and each time I feel the magic influence of her rays, I will bless thee, O my God! and thank thee for the daily benefits I receive, as well as for those reserved for me at a future time. Blessed for ever be thy divine mercy, which permits me to hope that when time here shall be no more, my glad soul shall quit these narrow confines, to repose in the bosom of its Creator, through the countless ages of eternity. Were it not for this certainty of immortality, this fond hope of eternal life and happiness, few would be the incitements to virtue, and weak the inducements to mental improvement; when oppressed by care and weighed down by misery, we should have little encouragement to continue longer in a world chequered by misfortune; or, did affluence favour us, we should be tempted to indulge in the thoughtless round of continued dissipation. But with the expectation of a future glorious state of existence, we can smile at care and trouble, arm ourselves against the fleeting pleasures of this life, and pity the deluded disciples of folly and dissipation.

MARCH X.

HOAR-FROST.

At this season of the year we very frequently observe the bushes and other matters exposed to the morning or evening air, acquire a sort of crust on the surface, as if they were candied. This is what is called hoar-frost, which is merely the exhalations and moisture condensed and frozen by the coldness of the surrounding air. The dew which during the day has evaporated from the earth, descends in the night, and in cold weather becomes congealed, putting on that white appearance we so often observe in a morning; and as the large bodies retain their heat the longest, we generally see more of the frost upon the hedges and grass than on the larger trees. The dew coming in contact with bodies colder than itself, imparts to them a portion of its heat, the loss of which, if considerable, occasions it to lose its fluidity; when its particles condensed unite more closely, and form a slender coating of ice. In this manner our hair, as well as that of animals, is sometimes covered with hoar-frost: the perspirable matter exposed to the cold air becomes congealed, and this effect is produced. Thus also are formed the icicles we see hanging from the houses in winter: the water dropping down imparts the heat it contains to the colder air, and thus losing its fluidity becomes congealed.

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MARCH XI.

MEANS WHICH CONTRIBUTE TO FERTILIZE THE EARTH.

The wisdom of God employs a variety of means to render the earth fruitful. At one time the opening clouds shower down the rain, which softens and nourishes the earth; at other times, when deprived of the benefit of rain, a gentle dew refreshes its surface, and animates the feeble plants, languishing for want of moisture. Each season has its peculiar means of fertilizing the earth. The snow, which, during the winter, covered our fields and our meadows, not only preserved them from the effects of the cold, but tended to their subsequent fertility. The frequent tempests in the spring preserve the purity of the air, dry the earth, and disperse the rain more generally over its surface: with each storm of wind and of rain the Creator scatters his blessings upon the earth.

We may safely affirm that there is no change in the air or upon the earth which does not directly or indirectly contribute to its fertility. Every season brings a succession of phenomena peculiar to it, each of which produces in nature effects, the beneficial influence of which is more or less visible. Even those plagues which desolate certain countries are only partial evils, conducing to fulfil the great designs of Providence, and from which advantages result to the world at large. Every where, and at all times, we have cause to be thankful to our Creator for his tender cares and parental solicitude.

"O Lord, God of times and of seasons! thy praises reach from the centre of this globe to the heaven of heavens! Our sphere rolls through the starry expanse; now blooming with flowers, and now wrapped in snow; here blushing with the vine, there covered with thorns. Yet it still celebrates thy glory, and unites its music to the harmony of the spheres. When the snow and the ice convert our meadows into desert places; when the hurricane gathers in the air, the thunder peals, and the lightning causes the hearts of men to tremble; when rivers, bursting their banks with one vast swell, inundate a country, and all the elements seem to combine and prepare for the final destruction of the world; it is then thou art providing for the inhabitants of the earth life, joy, fertility, and abundance."

Here we may properly consider the means which God uses to fertilize the moral world. To lead men to a knowledge of his will concerning them; to inspire them with an aversion of sin, and a love for virtue and the practice of good; he sometimes speaks the language of gentleness and persuasion in their hearts, at others in a louder and more terrible tone. Sometimes he appals the guilty by the severity of his judgments; and awakens the indifferent from their slumbers by the force of their sufferings. He declares himself to be hardened and unrelenting, as he formerly appeared to the Israelites upon Mount Sinai, clothed in lightning and speaking in thunder; but the softer heart he gently leads from vice with tenderness and mild persuasion

I am a living witness of his divine beneficence, and I acknowledge, with praises and thanksgiving, that he has exercised all these means to draw me nearer to his presence. Sometimes it has pleased him to confound my pride by chastisements, and to awaken me to a sense of my duty by various afflictions and trials, which, whilst they softened my heart, tended to wean my affections from the things of this world. At other times he has visited me with his blessings, and his favours have descended upon me more abundant than the vernal showers. But what return have I made for these benefits? Have I brought forth fruit, which a good soil never refuses when cultivated? Alas! my heart rather resembles a rock, which the thunder cannot shake, nor the rain penetrate; yet I hope, O God! the time will arrive, when I shall become more submissive to thy will, and more disposed to obey thy commands. The longer I put off the hour of repentance, the more my sins multiply, and the more difficult I find it to purify my heart: and I pray to the Almighty God that he will not leave me a prey to my own evil disposition, but that he will graciously condescend yet to bear with my weakness, and enable me to draw nearer to him: whether it will be my lot to experience hardships and misfortunes, or to pass along the vale of years in peace and tranquillity, I will bless the God of my salvation, and pray not that I may pass my days in indolence and vanity, but that I may be productive of good works.

MARCH XII.

OF THE ADVANTAGES DERIVED FROM THE SEA.

A merely superficial view of our globe might give occasion to believe that there is no proper proportion observed between the earth and the water, the vast expanse of the latter seeming to accord ill with the accustomed wisdom and goodness of God. We think that we should have received more benefit, if it had pleased the Creator to have suffered the great space occupied by the seas and the ocean to have been solid land. Short-sighted and ignorant men! are you yet to learn that nature does nothing in vain, and that God has formed this earth with inconceivable wisdom and harmony in all its parts? If the ocean was reduced to only half its present size, half the exhalations which now ascend from it would cease to form clouds, in consequence of which the earth would not be sufficiently irrigated; for great part of the rain which descends from the skies is an effect of the heat causing an evaporation from the surface of the sea. Thus we find the ocean is the grand reservoir, which supplies the earth with moisture, and consequently with fertility. If the extent of the seas should be diminished, great part of the earth would become as a desert, dry and sterile, from the want of rain; and the sources of those rivers that depend upon the rain would be exhausted. The intercourse between distant nations being cut off, or rendered nearly

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impracticable, commerce would cease; by which we should be deprived of many of the necessaries and comforts of life, besides losing that expansion of mind which arises from our knowledge of foreign countries, and an acquaintance with men and customs different from our own. For it is an incontrovertible fact, that in proportion as the inhabitants of a country keep themselves confined within their own little territory, without any intercourse with foreign nations, they become contracted, prejudiced, and ignorant.

Let us then acknowledge, with gratitude, the wisdom of God in this beautiful arrangement of the universe; that the same medium through which we become acquainted with every part of the universe is the great source of all our treasures, whether in commerce or in agriculture, and supplies millions of people with their daily food and support.

MARCH XIII.

DIFFERENCE EXISTING BETWEEN ANIMALS AND PLANTS.

The difference between animals and vegetables is so obvious, that we can readily distinguish them by the slightest observation. The most striking distinction is the power which animals possess of moving from place to place, which vegetables do not enjoy. Another very essential distinction is the faculty of perception, which animals have in a greater or less degree, but which is not common to plants. A third difference is the manner in which they are nourished. Animals, by means of proper organs, have the power of selecting that kind of aliment which is adapted to their nature: whilst plants are obliged, without choice, to receive such as the earth and water offer them, or perish for want. By means of vessels they imbibe the succulent juices of the earth; and their leaves, likewise furnished with vessels, absorb the moisture of the atmosphere which circulates through their system. The variety of species is much greater in the animal than in the vegetable kingdom; amongst insects even, there are perhaps a greater number of classes (including those distinguishable only by a microscope) than there are species of plants known on the surface of the globe. Animals have less conformity with each other than plants have, which renders them more difficult to classify.

Another distinguishing characteristic is the different mode in which animals and plants are propagated: and plants, whether they appear above the surface of the earth or are buried beneath, whether they float above water or are below it, have their roots fixed in the earth; whilst animals are found at large on every part of the earth, or they inhabit the air, or dwell in the waters; they are found every where throughout nature. And lastly, they differ from each other most materially in their form. Yet, notwithstanding these certain and obvious characteristics, we are far from having discovered the exact limits

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of these two kingdoms, or from knowing how to distinguish them in every instance; nature, in diversifying her works, makes use of shades almost imperceptible. In the great chain of beings the links are beautifully formed; from the highest to the lowest the degree of perfection gradually falls; but by such a gradation, that the most perfect differs but little from the one immediately next to it. We find some plants endowed with sensibility, and some animals that are nearly void of sensation. Corals formerly were thought to be marine plants; but subsequent observations prove them to belong to the animal kingdom: and there are many substances which naturalists are not yet determined under what class they should be arranged, so difficult is the task of assigning the precise limits to either kingdom; and the more our observations are multiplied, the more shall we be convinced of this difficulty, arising from the great resemblance between some of the inferior species of the animal kingdom with certain vegetable productions.

Our researches into nature are always attended with this happy effect; that the more we see of her works, whether animate or inanimate, the more we are convinced that the world, with all the vast variety of beings which it contains, is the work of an infinite and all-powerful God. Such beauty, harmony, and variety, could not be self-created, but must proceed from an Almighty, Omniscient, and Infinite Being, whose power and goodness we trace through all the varieties of animated beings, beginning with the meanest reptile that crawls on the earth, and proceeding from link to link till we arrive at man, the angels, and God himself, the great First Cause of all; or we may begin with the rudest species of matter, the stones upon which we tread, and mark the variations till we reach those luminaries that nightly present their revolving orbs to our astonished view. All speak the glory of God the Creator, and evince his protecting power and fatherly care: the rays of his perfection beam on all his works; his mercy and goodness are impartially diffused over the creation; and such men only meet with superior favour and divine regard, who act as becometh those who are conscious that all their deeds are known to a superintending Providence, which loves them as they love one another.

MARCH XIV.

UNIFORMITY AND DIVERSITY IN THE WORKS OF NATURE.

The heavens above, and the earth beneath our feet, though they offer us at different times varied spectacles, and a diversity of beauty, still from year to year remain the same, and lose nothing during the lapse of ages. At one time the face of heaven is dark with clouds or obscured by mists; then again serene and of a pure azure, or streaked with the most beautiful colours. The midnight darkness

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yields to the silvery light of the moon, which in turn is lost in the glory of the morning sun. One while the vast expanse of the heavens displays nought but gloom; at another, it is impossible to number the constellations that illumine the regions of space. If the heavens undergo various revolutions, the earth is not less subject to change. Within a very short period the severity of winter has withered its charms, and rendered it one immense field of uniform sterility. But soon the returning spring, succeeded by the warm summer, will restore its beauty, bring back its delights, and open out its treasures; and autumn will follow to mellow the fruits that required a long time to be matured. Again, what a varied aspect is presented by different countries upon this globe! In one, we see plains whose utmost boundaries no eye can penetrate, whose beauties no tongue can describe: in others, mountains whose waving tops fan the breeze, and at whose base extend valleys, watered by the richest streams, and laved by the purest rivers. Here gulfs yawn, and precipices threaten; there the high hill dances in the reflecting wave, and the calm lake gently washes the distant shores; whilst afar off is heard the rush of the torrent, and the impetuous roar of the cataract. Wherever the eye turns it meets with variety to interest; the mind is expanded, and joy and delight cheer the heart.

The same assemblage of uniformity and variety exists throughout the vegetable kingdom; the subjects of which all proceed from the same bountiful mother, and receive the same kind of nourishment: yet what an astonishing diversity in the different species, both as to form and properties! Thus we see the oak towering above the grass, and the elm looking down upon the humble primrose. All that bear a resemblance to each other in certain particulars, are arranged under the same class. It is the same with regard to animals, which are likewise arranged under different classes according to their resemblances in certain points. And however man, by the superiority of his faculties, is raised above plants and animals, some things he enjoys in common with the meanest of them. Like them he requires nourishment, and like them cannot live without air, water, the earth, and the influence of the sun. Plants grow, ripen, increase, wither, and die; and these laws of nature extend to man and the whole animal creation.

If we proceed to examine the varieties of the human species, what a wonderful mixture of conformity and diversity we meet with! Human nature in all places is generally the same; and yet, through all the extent of the peopled world, we find that, in this multitude of men, each individual has a figure peculiar to himself, a physiognomy, and certain properties and qualities of mind and disposition, which form his character, and serve to distinguish him from all the rest of the species.

Naturalists, for the sake of accuracy and facilitating their researches, have formed three general heads or kingdoms; the animal, the vegetable, and the mineral, under which they arrange all the productions of nature: these again are subdivided into classes, ge-

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nera, and species. Thus every substance in nature is arranged under one or other of these general heads; and by being acquainted with the characteristics of any particular class, when we meet with a new production, we know whether or not it is entitled to a place in this class.

From this assemblage of uniformity and diversity, which is infinitely extended, arise the order and beauty of the universe. The diversity of form and properties between the creatures of the earth displays the wisdom of God, who has designed each to hold a certain place and rank in the creation, to answer certain purposes; and he has so ordered, that no one can destroy the relations and oppositions he has established amongst them. He has founded his government upon wisdom, and regulated every thing for the utility and enjoyment of his creatures. Confined as are the views of man, partial and contracted as are his thoughts, he yet is capable of knowing and feeling this truth; the slightest examination of the universe declares it to him; and the farther he penetrates, the more he regards God manifested in his works, the more his mental powers will increase, and the less will he be affected by the contaminating influence of a base and sordid world.

MARCH XV.

OF SEEDS.

Vegetables spring from seeds; but the greater part of them are not sown by man, and are even invisible to him: they are dispersed by the winds, fall upon different parts of the earth, take root and spring up. For this purpose nature has furnished them with different means; some she has provided with a light down, which renders them more capable of floating on the air, and being dispersed to different places; others are sufficiently heavy to fall immediately to the ground, and bury themselves in it without any assistance; and others, that are light enough to be borne along by the wind, are often provided with little hooks, which, laying hold of different substances in their way, arrest their progress, and prevent their being scattered very far from their native soil. Some of them are enclosed in elastic capsules, which, at certain periods, burst open, and shoot out their contents. And there are trees which owe their origin to the birds of the air: oaks have been known to spring up from the care of ravens; it is supposed that, led by instinct, they make holes in the earth with their beak, and deposit the acorns, which they cover over with earth and moss, as a supply of food when other sources fail. Many seeds after being swallowed by birds remain uninjured, and through their medium become plants, thrive, blossom, and produce new seed. If to the care of man alone the fields were destined to receive their beauty, and the forests their verdure; if no seeds were to take root in the

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earth but those coming from the hand of man; how desolate would be our meadows, and desert our groves! But at the return of spring the soil again waves, and the odour of a thousand flowers scents the air, without the assistance of man. Yet these are not all the wonders which the consideration of seeds presents to us; the whole plant is contained in one little seed: within the narrow compass of the acorn are concealed all the rudiments of the oak, the monarch of the fields and the pride of nations. And we farther trace the wisdom of the Creator in the admirable structure of the seed, upon the preservation of which must ultimately depend the existence of the vegetable world.

How carefully, and with what precaution, are the blossoms and seeds of those plants which continue all the year in the earth enclosed in and defended during the winter by strong tunics of a curious texture! And plants which cannot bear the cold of winter are preserved beneath the surface of the earth in the form of roots, till the vernal sun causes them again to germinate, and flourish with renewed charms. Some seeds are placed in the middle of the fruit, others enclosed in capsules and sheaths, each being defended and protected in a most beautiful manner, at once displaying the power and the mercy of the Creator, whose hand is seen in every thing. The least of nature's works manifest his wisdom and goodness. And now whilst the busy husbandman deposits the different seeds in the earth, may I be seriously occupied with my God, who alone can sow the seed of righteousness, and bring forth fruit.

MARCH XVI.

GRANDEUR AND DISTANCE OF THE SUN.

If we have never properly considered the narrow compass of our earth, or are too ignorant to perceive our own insignificance, we may perhaps be benefited by considering that immense body which communicates light and heat, not to our world only, but to many others. The sun, nearly in the centre of all the planets and comets, may be regarded as the monarch of many worlds, to which he imparts light, heat, and motion. This alone would lead us to conclude that his size is prodigious, and this opinion is confirmed by his apparent magnitude, notwithstanding his immense distance from us. But the calculations of astronomers have certified us of this beyond the possibility of doubt. From them it appears that the diameter of the sun is about 100 times greater than that of the earth, and consequently he is a million times larger than the whole earth.

Astronomers have differed respecting his distance; the truest calculation makes it about 82 millions of miles. Some planets move in their orbits much nearer to the sun, and others at a greater distance, than does our earth; but though, if formed like our globe, in the one

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case they perhaps might be consumed by the heat, in the other wrapped in cold and darkness, we have reason to believe that those spheres which move round the sun, whether nearer to him or more remote than our earth, are so constituted, that neither the globe itself, nor its inhabitants, suffer from their situation.

Perhaps it will be urged, that what we have stated respecting the magnitude and distance of the sun is exaggerated: for we can discover nothing so great as the earth which we inhabit, and with which we compare the sun, which is a million times greater. This luminary from its prodigious distance appearing so small, ignorant people are disposed rather to believe that which they can see with their own eyes, than give credit to calculations which their reason cannot comprehend. But had we been placed on a planet whose magnitude bore the same proportion to the earth as the earth now does to the sun, we should have been equally incredulous as to the dimensions of this earth, compared with that we then inhabited. It is far from being strange, then, that we should be astonished when we are told of the distance and vast magnitude of the sun.

This admiration ought to make us ascend to that Being which is its Creator, Director, and Conservator; compared with which, the grandeur and brilliancy of the sun are as nothing: consider the glory of him who created it, and you will find infinitely more incomprehensibilities than when you only reflect upon the grandeur of the sun. If the earth, compared with the sun, is so small, what must be the littleness of man compared with his Creator! If the space between the earth and the sun is found to be so immense, what an inconceivable distance is there between man and the infinite God!

'Who is like unto thee, O Lord! What can be compared unto thee? Thy glory is exalted beyond the reach of praise, and thy grandeur above the comprehension of man. Glory, splendour, and majesty surround thee, the principle and source of life; and light encircles thee as a garment.' But whilst we admire the sun as he shines above the horizon, let us not forget our divine Redeemer, that sun of righteousness which visited us in our afflictions, and whose rays impart life, health, and eternal salvation; and without which, deprived of light, virtue, and consolation, we should still wander in darkness, ignorance, and the grossest sin!

MARCH XVII.

UPON THE IMPERFECT KNOWLEDGE WE HAVE OF NATURE.

Why has not the Creator given us the power of investigating and explaining all the phenomena of nature, for which purpose the limits of our understanding are too confined? He wills that we should become acquainted with his perfections, that we might magnify his name. Would not then the most certain means of knowing and ap-

preciating his attributes be, to have a more intimate acquaintance with the works of the creation? It seems to me as if I could much more admire the grandeur of the Supreme Being, and contribute much more to the exaltation of his holy name, if I was enabled to comprehend the whole, to know the perfections of each part, and to discover all the laws and springs of nature. If I now can admire the infinite greatness of God, when I only know a small part of his works, what would my sentiments be, how absorbed in the meditation of his glorious attributes, with what awe and veneration should I adore him, if I could fully penetrate into the wonders of nature, and explain with certainty the phenomena she brings forth!

But perhaps this mode of judging is erroneous; for since God has not thought fit to give us a more profound knowledge of nature, we are to suppose he prefers the degree of adoration and glorification he now receives from our limited faculties, to that he would have, were we to enjoy a more perfect state. Have we any reason to be surprised that in our present condition we are ignorant of the first principles of nature? Our senses are unable to penetrate into the essence of things, and we cannot form an idea of objects which our senses are incapable of observing. And there is an abundance of things which our senses cannot discern. If we wish to represent to our imagination any thing infinitely great, or infinitely small, they elude our grasp. If we reflect upon the rapidity with which the rays of light pass, we are incapable of following the velocity; and when we wish to conceive an idea of the vessels and circulation of blood in a creature a million times less than a grain of sand, we feel the inadequacy of our mental powers. Hence, as nature ascends from what is infinitely small to what is infinitely great, we shall not be surprised that we cannot penetrate its real principles.

Notwithstanding this imperfection in our abilities, we have no reason to complain that our knowledge of nature is so slight; we have always before us a vast field of improvement, in which we are incited to labour by every thing that can arouse and interest. Our faculties are so formed, that by cultivation they improve, and are capable of expanding to a greater degree than is generally supposed; we are continually adding new truths to former experience, and as we proceed we discover more to encourage our researches; and the more enlightened we become, the farther we penetrate into the mysteries of nature, the more we find to raise our ideas of the glory, the power, and the goodness of the Almighty Creator. May we always, O God! be favoured with the light of thy Holy Spirit, to guide us on our way; to enable us rightly to direct that knowledge we are enabled to acquire, and never to mistake or pervert those abilities with which we have been blessed, on the proper or improper use of which depends our future misery or felicity!

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MARCH XVIII.

THE UTILITY OF VEGETABLES.

If we consider the great number and diversified appearance of vegetables, we shall perceive, as in every thing else, the beneficent designs of the Creator. What other end could he have in view in covering the earth with so many different herbs, plants, and fruits, than the advantage and felicity of his creatures? Such is the number and variety of plants, that upwards of 30,000 species have already been enumerated; and every day more are added to the list. Their increase seems infinite: who, for example, is not astonished when he is told that one single grain of maize (Indian wheat) produces 2000 more; that one poppy-seed multiplies itself so, that, in two or three years, it produces sufficient to sow a large field? Hence, no one can doubt the care of Providence, particularly when they consider the use that has been made of vegetables from the earliest ages.

Do not fruits and vegetables daily furnish us with the most salubrious and nourishing aliment? And are we not indebted to the vegetable kingdom for the greater part of our clothing, furniture, and habitations? Every part of a plant is of some utility. The roots afford us food, medicines, pitch, dyes, and various utensils. With the wood we construct our buildings, furniture, and different instruments, machines, &c.; it likewise serves us for fuel, and from it we procure charcoal and medicines. The bark is of particular use in tanning, as well as in the cure of some diseases. The ashes are useful in fertilizing and ameliorating the soil, bleaching cloth, and making saltpetre. The resin is used in painting, and enters into the composition of pitch, tar, and balsams. Turpentine is used as a medicament, and colophonia (hard resin) to varnish, to solder, and to rub the strings of musical instruments; and mastic is used in perfumes.

Flowers, delightful both for their beauty and fragrance, are very useful in medicines, and supply the bees with their wax and honey. Fruits are singularly beneficial and grateful, whether fresh from the trees, boiled, dried, or preserved. But it is not man alone which receives advantage from the vegetable kingdom; the greater part of animals derive their nourishment from that source. For this purpose we find fields and meadows innumerable, covered with every variety of plants and vegetables. The wants of every individual are provided for; each knows the kind of vegetables most suited to its nature; and no one can number the blessings afforded by this kingdom, nor find expressions to celebrate the goodness of God.

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MARCH XIX.

STRUCTURE OF THE HUMAN HEART.

How wonderfully and exquisitely formed is that muscular body, situated within the cavity of the chest, and called the heart? Its figure is somewhat conical, and it is externally divided into two parts: the base, which is uppermost, and attached to vessels; and the apex, which is loose and pointing to the left side, against which it beats. Its substance is muscular, being composed of fleshy fibres, interwoven with each other. It is divided internally into cavities, called auricles and ventricles; from which vessels proceed to convey the blood to the different parts of the body. The ventricles are situated in the substance of the heart, and are separated from each other by a thick muscular substance; they are divided into right and left, and each communicates with its adjoining auricle, one of which is situated on each side the base of the heart. The right auricle receives the blood from the head and superior parts of the body, by means of a large vein; and in the same manner the blood is returned to it from the inferior parts, by all the veins emptying their stores into one, which terminates in this cavity; which, having received a sufficient portion of blood, contracts, and by this motion empties itself into the right ventricle, which also contracting propels the blood into an artery, which immediately conveys it into the lungs, where it undergoes certain changes, and then passes through veins into the left auricle of the heart, thence into the left ventricle, by the contraction of which it is forced into an artery, through whose ramifications it is dispersed to all parts of the body, from which it is again returned to the right auricle; thus keeping up a perpetual circulation: for, whilst life remains, the action of the heart never ceases. In a state of health the heart contracts about seventy times in a minute, and is supposed at each contraction to propel about two ounces of blood; to do which, the force it exerts is very considerable, though neither the quantity of force exerted, nor of blood propelled, is accurately determined.

The heart comprises within itself a world of wonders; and whilst we admire its admirable structure and properties, we are naturally led to consider the wisdom and power of Him who formed it, from whom first proceeded the circulation of the blood and the pulsation of the heart; who commands it to be still, and all the functions instantly cease to act: in God alone we live, move, and have our being; and may we never, whilst the vital stream flows through our veins, forget his goodness, or repay his love with ingratitude!

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CALIFORNIA

MARCH XX.

THE CHANGE OF SEASONS.

The coldest as well as the warmest climates have but two seasons in the year, which are essentially different. In the coldest countries the summer continues about four months, during which the heat is very powerful; the rest of their year may be considered as winter. Their spring and autumn are scarcely perceptible, because in the space of only a few days an excessive heat succeeds the greatest degree of cold, and the extreme of heat is succeeded as rapidly by the extreme of cold. The hottest countries have a dry and scorching season for seven or eight months; when the rains descend, and continue four or five months, this being the only distinction between their summer and winter.

It is only in temperate climates that we find four distinct seasons of the year. The heat of summer slowly departs, by which the fruits of autumn are rendered mature, without suffering from the winter's cold. And in spring plants are enabled to germinate, uninjured by remaining frosts, and not hastened into premature efflorescence by too early warmth. In Europe, we observe these seasons most distinctly in Italy and the south of France. In the temperate regions summer and winter generally commence with abundant rains, which continue for a considerable time. From the middle of May to the latter end of June it seldom rains; but after this time heavy rains sometimes set in, and continue till the end of July. The months of February and April are usually very variable.

The change of seasons deserves our utmost attention and admiration: it is not effected by blind chance, for in fortuitous events there is neither order, constancy, nor regularity; whereas in every country of the earth the seasons succeed each other regularly as the day follows the night, and precisely in the expected time the aspect of the earth changes. We see it successively adorned with herbs and leaves, with flowers and fruits: it is then deprived of its ornaments till spring returns to restore them with increased beauty. Spring, summer, and autumn, nourish and gratify the animal creation by the fruits which blossom, increase, and ripen in luxuriant abundance. And though in winter nature seems to droop and to be dead, this season is not without its benefits.

Now that this month is so far advanced, we may begin to hail the near approach of spring, and all its accompanying pleasures, with transport and delight. How many are there who have longed to see this restoration of nature, and hoped to be recovered from the sufferings they endured during the winter, to whom this consolation has been denied, the thread of their lives being snapped ere the vernal breezes have refreshed the earth! Perhaps this is the last spring we shall be permitted to see, the last time we shall enjoy the freshness of the morning air, breathing the sweets of the opening flowers. Before

the return of the equinox we may be mingled with the dust, inhabitants of the silent tomb. May this reflection dispose us to feel the true value of life, and teach us that serenity of soul and Christian fortitude, which will enable us to receive the awful messenger without fear, and hear the summons without regret!

MARCH XXI.

EVERY THING CREATED HAS ITS USE.

If there is a superintending Providence which governs the world, the smallest things and most trifling events must feel its influence, and nothing under the agency of his Power will occur without some evident utility. Perhaps it will be said, 'What a number of things there are in the world of no use whatever! The north-wind blows, and the blossoms of trees are scattered; they wither and are useless. Seeds, which might have produced new plants, perish without bringing forth fruit. Multitudes of insects are not only useless, but extremely injurious to man, beasts, and vegetables. Many men and animals scarcely show themselves upon the earth, when they disappear; others are born monsters, impotent, and deformed. How many faculties and talents are lost for want of being called forth! How many noble projects and bold enterprises miscarry before they arrive at maturity! Would all this take place, if a Being infinitely wise and provident governed the universe?'

But have you who thus dare to doubt the being and providence of God a perfect knowledge of all things, with their relations and dependencies amongst each other, to pronounce your decisions with certainty, and promulgate such sentiments with confidence; to say, This can do no good, that is absolutely wrong, or of no use? Never forget the narrow limits of your knowledge, nor the feeble rays of your light. It is your duty to observe in silence the ways of God, and to admire and adore him in those works; which so far from justly criticising, you are not able to comprehend: all those which you do know you will find contain proofs of infinite wisdom, and are of a certain and manifest utility. A thing may be useful in different ways, and whilst it is serving one purpose we cannot expect that at the same time it should serve another. The insect, which at its birth becomes the prey of swallows, cannot produce a new generation. The researches of alchymists for the philosopher's stone have not, it is true, made gold more plentiful; but through their means many valuable discoveries have been made; and the insect supplies the swallow with its food. Your tears may not soften the callous unfeeling man, who abuses his power in oppressing the weak; but though your intercessions in favour of the unfortunate are fruitless, your tears are not lost, nor shed in vain: they tend to call forth the finer feelings of the heart, and increase that sensibility which is the source

of true knowledge and virtue; and there is a Being who hears your sighs, and to whom all your efforts on behalf of suffering humanity are known, and received as the most grateful incense.

Never let us suppose, then, that there exists any thing in the universe entirely useless. It is true there may be certain things which do not seem to succeed, nor answer exactly the end we expected them to perform; but they undoubtedly fulfil the purpose for which Providence designed them, and that belief is sufficient for us. For certain things to take effect and be realized, perhaps, it is requisite that others should fail and appear defective. If it is true that wisdom is not entirely engrossed about the present, but extends its views to the future; if God is infinitely wise, and if his wisdom is to be manifested to the world as in a mirror, there must occur many things which, separately considered, do not perfectly appear to accomplish their destination, because they required other causes to co-operate with them. The part which these have in the execution of the whole plan may be so imperceptible and so little understood, as entirely to escape our notice. But surely it does not follow, that because we cannot perceive the end they answer in the great system of nature, they do not contribute to its perfection, and are therefore useless; on the contrary, we have just reason to conclude, from what we see of the power and wisdom of God displayed in his works, that it is impossible for him to have created any thing without design or without utility; though, from our imperfect nature, we are not always able to perceive the object and use of some of his works.

This firm persuasion will contribute to our peace and happiness; for there daily occur in nature, and in the course of human life, events, whose connexions, relations, and designs, appear to us incomprehensible, and of no utility, and which might otherwise weaken our faith in God, as well as hurt and distress our feelings. But the more we are convinced by reason, observation, and experience, and confirmed by the testimony of the Holy Scriptures, that God, as he is infinitely wise and powerful, so also he is infinitely merciful and just, the more contented and cheerful shall we be in adversity as well as in prosperity. We shall then see and acknowledge, that all that God effects, or permits to be accomplished, is for the wisest purposes, and always for the universal good of mankind. And when we observe in nature so many trifling objects, apparently useless, and so many inexplicable events, seemingly repugnant to the divine plan, far from finding cause to complain, let us rather adore the wisdom of God, and ascribe unto him the glory which is his due; ever trusting to him for safety and support, and confiding in his power without the folly of cavilling at his dispensations. This submission to his will is the way to happiness here, and eternal felicity hereafter.

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MARCH XXII.

HARMONY BETWEEN THE MORAL AND PHYSICAL WORLD.

The wisdom of God has established so great an affinity between the earth and its inhabitants, that they seem to be formed for each other. There is a certain connexion and harmony which links together all the works of the creation. There is an evident analogy between the human body and the surface of the earth: as the bodies of plants and animals are formed, and come to maturity, then perish: so also are the bodies of men subject to similar changes. Such is the plan of the Creator, and it is pregnant with wisdom and goodness, adorned with perfection and beauty; it is only our imperfect knowledge which prevents our seeing it as it is.

If any one objects, 'Why then has not God given to every one the same faculties and the same degree of intellect?' we may answer—Who art thou, blind mortal, that callest God to an account for his works? Shall the creature dictate to his Creator, or question his powers? As well might we ask, Why God has not so ordered, that all countries on the earth, that every field, should be equally pleasant and fertile? Why do we find in some parts a rich and fruitful soil, whilst others are so sterile and desert, that all attempts to improve them are in vain? There can be no doubt that this diversity is highly beneficial, and worthy of our warmest admiration, though not always conformable to our mode of thinking. The most desolate and barren regions, as well as the most wild and uncultivated nations, have their beauty and use in the eyes of God; all hold that place which has been assigned them, and which is best adapted to their nature, in the immensity of created beings; and their variety serves still to manifest the wisdom of God, which is infinitely diversified.

But as it is manifestly the intention of Providence that the earth should be cultivated, and produce fruits in abundance for the preservation of its inhabitants; and as for this end he has given us corn to sow the earth, and seeds of various kinds to supply food and nourishment; so also he has given to each individual a mind, which, according as it is cultivated, will bring forth fruit; it possesses all the capabilities of virtue and of happiness, and only requires the seed to be sown to produce a harvest rich and abundant. With this view he has given to us lessons of true knowledge and religion, which, when received in a mind properly disposed and regulated, will produce exquisite fruit, and abundant as the corn planted in a fruitful field.

There are vast tracts of uncultivated and barren lands, where no verdure smiles, nor fruit refreshes, though they receive the fostering rays of Heaven; so also, notwithstanding the general diffusion of the Gospel, there are countries which still remain in darkness, and there are people yet besotted by ignorance and infidelity. And among the civilized nations of the Christian world the influence of the Gospel is often very slightly felt; many people know not what it is, do not

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comprehend it, nor have any idea of the saving power and sublime truths, of a pure and holy religion. Others receive it with eagerness and joy, and for a space acknowledge its influence; but the impression is not lasting, and soon becomes obliterated. Some are too much agitated by the passions and concerns of the world to attend to the gentle monitor: but there are some who receive the Divine word with a heart pure and incorrupt; they hear its dictates with pleasure, and, by following them with perseverance, become of the happy number of the wise and prudent, whose steps are marked by virtue, sincerity, and peace, to whom it is indeed the power of God unto salvation.

MARCH XXIII.

OF THE NATURE AND PROPERTIES OF AIR.

Air is a subtle fluid, which surrounds our globe, and which all living creatures respire. Although it is so near us, every where surrounds us, and we are continually experiencing its effects, we are not yet sufficiently acquainted with it to precisely determine its nature. We know that it is a substance, for when we pass our hand rapidly through it we find resistance; and we are certain that it is fluid, its particles are easily displaced, and yield to all kinds of impressions. Were it solid, we could neither inspire it, nor move in it with facility. It possesses weight in common with other bodies, being about 816 times lighter than water.* The force with which the air weighs upon every square foot of the earth is equal to a weight of 2160 pounds. And a man, whose surface is about fourteen square feet, sustains a weight of atmospheric air equal to 30,240 pounds. This may appear incredible; but the resistance of the air contained in our lungs prevents our suffering any inconvenience from the pressure of the external air, an equilibrium being thus preserved.

The elasticity of the air is equally certain; it is continually making an effort to fill a greater space, and, though capable of compression, as soon as the pressure is removed it again expands. This is sufficiently proved by means of heat, which rarifies it to such a degree, that it may be made to occupy five or six hundred times more space than it did before the heat was applied, without losing its elastic power. All these phenomena are highly worthy of admiration, and in them we may perceive the causes of many astonishing effects. It is in the air that our globe is suspended; and it is in the air also that the clouds are collected, forming so many beautiful shades and colours, and which, as they are rarified or condensed, suspend the vapours, or

* Its specific gravity, according to the experiment of Sir George Shuckburgh, when the barometer is at 30 inches, and the thermometer between 50 and 60 degrees, is 0.0012. One hundred cubic inches of air weigh 31 grains troy.—*Thompson's Chemistry.*

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permit them to descend on the earth, in rain, hail, or snow. Without air, life cannot be supported, nor fire and water exist.

Thus, then, the air also announces the grandeur, power, and goodness of God, whose infinite wisdom alone could adapt this element to so many and various purposes. God creates and governs the rain, the snow, the winds, the thunder, and the lightning; he measures the quantity, gravity, elasticity, and motion of the air, and mercifully causes it to serve our necessities, and contribute to the general welfare of our globe. Let us, then, who every moment breathe this air, which supports our lives, adore the depths of the riches of His marvellous wisdom and understanding, who alone has created all these things, manifested in the whole economy of nature with infinite splendour!

MARCH XXIV.

NOTHING NEW UNDER THE SUN.

With respect to man, no doubt, there are many new things which take place in the earth: in every season we see new flowers spring up, new fruits ripen, and the whole face of nature annually changes. Every day is productive of new events and new revolutions; the situation of objects is continually changing, or they present themselves to our senses under different forms. It is only relatively to the limited extent of our knowledge and understanding that there is any thing new under the sun; and in this light nothing is more true than the saying of Solomon, "What has been will be, and what has been done will be done, and there is nothing new under the sun." God has not thought fit to multiply things unnecessarily; there is every thing which can satisfy our wants, gratify our desires, and satiate our curiosity. Far from exhausting, we are scarcely able to acquire a superficial acquaintance with the works of the Creator; our senses are not sufficiently acute and powerful to perceive all the works of nature, and our understandings are too weak to comprehend them; so that we can never form a just and accurate idea of the creation, nor of every created being; hence we often believe many things are new under the sun which are only new to ourselves. As the empire of nature is immense, and as we can grasp only a very small part at one view, we suppose every thing we see for the first time to be new; because in every part of the world there is an infinite variety of appearance, and diversity of imagery.

Nature does not require a continued and endless creation; it is sufficient that the Supreme Being preserves the order which he established in the beginning. There is no necessity for a number of springs to vary the works already produced; for they succeed each other, and return in regular order, and yet appear so infinitely diversified as to seem always new. The impossibility of our numbering or

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conceiving the whole extent of the works of nature, whilst it convinces us of the weakness of our capacity, strongly proves the existence of one great first cause of all, an Almighty God.

But are there not many recent discoveries, entirely unknown to the ancients? Are we not now familiar with phenomena in the kingdom of nature of which we formerly had no idea? Most of these discoveries have proceeded rather from the stimulus of want, than that of arriving at truth. As our wants multiply, new means are necessary to supply them; but these existed long before we knew them. Minerals, vegetables, and animals, that have lately been discovered, already existed in the earth, or upon its surface, long before the researches of men brought them to light; and many that we imagine to be modern discoveries were very probably known to the ancients.

Were the world (what from the nature of things is impossible) the work of chance, the same fortuitous agent that caused its first existence might operate to-day as well as then; and we should be continually witnessing new productions. But the world and all created things being formed by a perfect Being, every thing that is made bears the stamp and broad impression of an all-powerful God, which established the foundation of the earth with wisdom, and formed in the beginning every thing that was essential to the preservation and well-being of the whole; so that there is no necessity for a new creation, or new laws, but all moves in harmony, guided by eternal sapience. In all, and through all, God is magnified and glorified: and to him is due eternal honour and everlasting praise.

MARCH XXV.

OF CAVES FOUND IN MOUNTAINS.

Caves are generally found in mountains, and very seldom in plains. They are frequently caused by the eruptions of volcanoes, and the explosions of earthquakes. But what end do such chasms answer? Though we could discover no certain end in their existence, we may take for granted that they are not formed in vain.

However, the purposes they answer are often evident; they serve as reservoirs for water, which may be had recourse to upon a deficiency of rain. They are also useful for the freer circulation of air through the earth, by more readily permitting its ingress and egress; and thus lessen the frequency of earthquakes. They sometimes fill with water, and form lakes; such is the lake Zirchnitzer, in Carniola, which fills in June, and loses its waters among the neighbouring mountains in September. It is sometimes navigable, and at others so dry, that the inhabitants may plough, sow, reap, and hunt in it. Another use of caves is the shelter and retreat which, during winter, they offer to animals. Hence we find more cause to admire the wisdom and bounty of God; and the deeper our researches penetrate

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into nature, the less shall we find of useless matter, and the greater reason we shall have to adore the sublimity and perfections of God in his works.

MARCH XXVI.

CIRCULATION OF SAP IN TREES.

The trees, which during several months appeared entirely dead, begin gradually to revive, and in the space of a few weeks will give much more evident signs of vitality; the buds will sprout, open, and the sweet blossoms expand. Though we have observed this revolution at the commencement of several successive springs, we have perhaps been ignorant of the means conducing to this end. The effects which we perceive in spring to take place in trees and other vegetables are caused by the circulation of the sap, which begins to move in the vessels containing it when acted upon by a milder air and increase of warmth. As the life of animals depends upon the circulation of blood, so does the life and growth of plants depend on the circulation of the sap, which is to them what blood is to animals. To effect this, nature has formed and adapted all parts of vegetables to concur in the preparation, motion, and conservation, of this nourishing juice.

It is principally by the bark that the sap, in the spring, begins to ascend from the roots into the body of the tree, and that even throughout the year life and nourishment are distributed to the branches and to the fruit which they bear.* The woody part of the tree is composed of small longitudinal fibres, extending in spiral lines, closely united together, from the roots to the summit of the trees. Amongst these fibres, some are so extremely small and fine, that a single one, scarcely as large as a hair, contains some thousand fibrillæ. There is an innumerable multitude of little tubes, in which the sap circulates, extending through all the body of the tree to the remotest branches; some conveying it from the root to the summit, and others returning it back again. During the heat of the day the sap rises through the ascending tubes, and returns by the descending ones in the cool of the evening. These tubes pass through the leaves, which are also supposed to answer the purpose of respiratory organs, and absorb the dew and moisture of the atmosphere.

The sap then is distributed through every part of the tree; its aqueous part evaporates by the pores of the vessels, whilst the oily, sulphurous, earthy, and saline particles blend together, to nourish the

* From the experiments of Coulomb and Knight, it would appear, that the sap does not ascend through the bark, but through the wood; and it is well known that a plant continues to grow even when stripped of a great part of the bark, which would not be the case if the sap ascended through the bark; and those who are in the habit of obtaining sap from trees are obliged to carry their incisions deeper than the bark, or they are unable to procure any sap.—E.

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tree and promote its growth. If the circulation of the sap is checked, if the internal organization of the tree is destroyed, either by a very severe frost, or by old age, or by some accident, the tree will die.

After such reflections as these, we shall no longer view the trees at this season with indifference, nor consider the change they are about to undergo as unworthy of our attention. Neither shall we observe the renovation of nature, without thinking of that God who has given life to all creatures, provided the trees with appropriate juices, given them the power of circulating the sap in vessels, and distributed to them life, growth, and nutriment. Yet how many people, year after year, unregarded let this season pass, and know less of the life and beauty of spring, displayed in plants and trees, than the cattle browsing on the plains. If ever they are blessed with another return of this season, may they begin to feel, and love to enjoy, the beauties of nature; and at length know, that the infinite Creator is near to us in every part of his works, and that each of his creatures proclaims his greatness. And may the Lord God, in his infinite mercy, grant, that whilst all nature rejoicing feels the reanimating influence of spring, we may awaken from our slumber, and walk forth to enjoy his presence, our hearts softened, and our minds prepared by his divine influence to know and to glorify his holy name.

MARCH XXVII.

IGNORANCE OF FUTURITY.

If we are ignorant of future events, we must not merely trace the cause to the narrow and limited faculties of the soul in its present state of existence, but we must go farther, till we arrive at the Creator himself, whose will and pleasure it is that the knowledge of futurity should be denied us. He knew the strength of man, and the extent of knowlege his imperfect nature was capable of bearing. The knowledge of futurity, like the splendour of the noon-day sun, could not be steadily contemplated; it would be fatal to the happiness of man, and dangerous to his virtue.

Supposing that the future events of our life marked a bright and prosperous tract; whilst we viewed this at a distance, and anticipated that happiness which we knew certainly awaited us, our present enjoyment would cease, we should no longer be contented and cheerful, but wait with impatient anxiety for those blessings which were held up to our view. But, on the contrary, was the prospect of future contingencies gloomy and marked by affliction and sufferings, the moment we read our fate our happiness would cease: the days which hitherto had been passed in peace and tranquillity would now rise in sorrow and depart in gloom. With a known evil impending over our heads, each morning bringing us nearer to the dread moment, we should live in hopeless misery, the prey of sorrow and despair, insen-

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sible of all the blessings around us. How infinitely merciful and wise then is that God who has shrouded futurity in darkness, gradually unfolding the veil as the events occur; so that we are never at once overwhelmed by the torrent of adversity, nor confounded by the blaze of certain prosperity?

Let us then never suffer ourselves to be disappointed by the delusive hopes of happiness, nor be rendered miserable and wretched by feeling the weight of misfortunes before they arrive. Let us rather thank the Almighty that our ignorance of futurity saves us from many a pang of inquietude, and delivers us from many a throb of anxious dread and fearful despondency. If we feel assured of the grace of God through the mediation of Christ, we have just reason to hope that futurity will unfold to us with joy and gladness; and as there is a just and gracious God, who orders and directs the universe, who knows all the events of our lives, and before whose view is continually present the circle of eternity; we may with safety, when we lie down to sleep, commend ourselves to his care, undisturbed as to what may happen during the night; and when the morning sun summons us to our duties we may trust ourselves to his protection, without anxiety for the events which are to befall us during the day. And in the hour of trial, when dangers threaten and destruction seems to impend, let us still remember the goodness of God, and repose upon his protecting arm, in perfect assurance that whatever happens is for our good.

MARCH XXVIII.

GRADUAL APPROACH OF NIGHT.

Night is a blessing bestowed upon us by the Creator, and is wisely and mercifully directed to advance by degrees. The sudden transition from the light of day to the gloom of night would be highly inconvenient and terrific. So immediate a change would occasion a general interruption to the labours of men, and terror would be spread over the earth; all living creatures would feel its influence, and the organs of sight must suffer considerably by the suddenness of the transition. Hence it is wisely ordered, that darkness does not surprise us suddenly in the midst of our occupations, but advances by slow gradations, and the twilight which precedes it leaves us time to finish our most pressing affairs, and to make the necessary arrangements. By this timely warning, the approach of night does not interrupt or incommode us.

But whence proceeds that lingering light, which at the end of each day remains to temper and soften the gloomy aspect of night? We no longer see the sun, and yet a degree of lustre still cheers us. The atmosphere which surrounds us refracts the rays of the sun, projected on its superior surface, and it continues to receive these rays after the

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earth by its rotation has withdrawn our sight from the sun; by which means we enjoy the light much longer.

Thus a bountiful Providence has not only regulated the greater revolutions of the seasons, but also the daily alternation of light and darkness in that way which is most beneficial to us, and which demands our most heartfelt acknowledgments and thanksgivings. Let this gradual approach of night remind us of the evening of life, which advances by slow and certain degrees, till almost imperceptibly the hand of death lies heavily upon us. May the Almighty grant, when the period arrives which is to close our eyes in darkness, that as the measure of our days is full, so also may the measure of our good works be completed! Let us work whilst it is day, for the night cometh, in which no man can work.

MARCH XXIX.

MAGNIFICENCE OF GOD DISPLAYED IN HIS WORKS.

Why are all the works of God so beautiful and magnificent? Why do we every where discover various and innumerable objects, each clothed in peculiar charms, and ostvying all the rest in beauty? Whence is it that we every where find new subjects of astonishment and admiration? Doubtless that we may be led unceasingly to admire and to adore that Being, who is so infinitely more beautiful, sublime, and glorious, than all that we can discover or delight in throughout nature. We cannot help saying, If the works are so admirable, what must be the Creator of them! If the beauty of the creatures is so excellent, how inexpressible must be the grandeur and nature of the Being who formed them, and who sees the whole creation at a single glance!

If the meridian sun has splendour, the blaze of which dazzles and confounds our sight, we may well suppose, that He who first imparted life and being to this luminary, dwells in light inaccessible, utterly removed from the penetration of finite mortals. We cannot suppose he is less wonderful than the creatures he has formed; and the more striking and marvellous are his works, the more he must excite our astonishment and call forth our admiration: could we comprehend at once the totality of his grandeur, he would cease to be God, or we to be men.

There is no better way then of enlarging our views, or gaining a richer treasure of ideas and more ample intelligence, than in contemplating God, the grandeur and magnificence of whose works are beyond the limits of comprehension. By such contemplations all the faculties of the soul acquire strength and vigour, and our capability of enjoying happiness both here and hereafter, becomes abundantly increased; for the more the capacity of our minds is enlarged here by contemplating the Supreme Being, the more ennobled and exalted

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will it be, and the greater will be its power of comprehension and of enjoyment in futurity. Let us then divide our attention between God and nature, which last reflects as from a glass the image of that Eternal Being whose presence we only see from the effects produced. We may collect the various beauties and perfections dispersed through the creation, and when their innumerable multitudes have struck us with astonishment and admiration, we may think how little and insignificant are all these compared with the perfection of the Creator; no more than a drop of water to the ocean.

Let us regard the most lovely and beautiful of created beings, abstracting what is finite and limited, that we may have more just and exalted ideas of the infinite excellence of the Creator; and when the sight of faults and imperfections in the creatures shall tend to lessen our admiration of their beauty, let us exclaim—If the creation, notwithstanding all its defects, be so beautiful and grand, how great and wonderful must He be whose splendour, ever unobscured, is purer than light, and more brilliant than the sun! Let us then employ all our faculties in contemplating the all-adorable God; and not rest till we have taken our flight to the regions of perfection, where the most perfect of beings reigns in undisturbed felicity. Let our principal study be to learn to know God; for there is nothing so great as he is, and the knowledge of him alone will satisfy our desires, and diffuse through our hearts peace and joy, which nothing can molest or destroy; and it is in some degree a foretaste of that more perfect knowledge which shall constitute our felicity, and be our constant reward through eternity.

MARCH XXX.

ARRANGEMENT OF THE SEASONS IN DIFFERENT PLANETS.

The diurnal rotation of the earth round its axis, and its annual revolution round the sun, afford us the greatest advantages; which would induce us to suppose that the other planets enjoy similar blessings. All of them, except Mercury, have been observed to turn round their axes in different spaces of time; and most probably he is subject to the same general law, though his precise motion has not yet been determined. All the planets move in their orbits round the sun, and even the secondary planets make a similar revolution round their primaries. And as the diurnal rotation of our earth effects the constant vicissitudes of day and night, and its annual revolution the change of seasons, we have just reason to conclude that similar changes take place in the other planets.

Venus turns round her axis in little more than 23 hours; Mars in 24 hours 39 minutes; Jupiter in 9 hours 56 minutes; the moon in about 28 days. If we were to divide the day, that is, the time in which these revolutions are made, into twenty-four equal parts, each

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of which shall be called an hour, the hours of Venus will be a little less, those of Mars rather greater, and those of Jupiter not half so long as the days in our planet; whilst those of the moon will each be more than equal to one of our days. We may also observe that the axis of each planet is inclined like that of our earth; whence it follows, that during their revolutions round the sun, their north pole is sometimes more, sometimes less, enlightened. It is then reasonable to suppose that they experience a change of seasons as well as the alternation of long and short days.

Perhaps it will be asked, 'Why all these reflections?' They would be useful, if only to extend our knowledge; but they will be still more important, if we think of the consequences which must result from them. Shall we not have reason to conclude, that other planets besides our own are inhabited by living creatures? All the planets resemble our earth; like it enjoy the light and genial warmth of the sun, have the alternation of night and day, and the succession of summer and winter: but what end would all these phenomena answer unless the planets were inhabited? Considering them as so many peopled worlds, what a sublime idea we conceive of the grandeur of God, and the extent of his empire! How impossible to fathom his bounty, or penetrate the limits of his power! His glory, reflected from so many worlds, fills us with amaze, and calls forth every sentiment of awe, veneration, and gratitude. Supposing that his praise is celebrated in all the worlds which roll above and around us, let us not be surpassed in our adoration, but in holy emulation mingle our hymns with those of the inhabitants of these numerous worlds, and celebrate the Lord God of the universe with eternal thanksgivings!

MARCH XXXI.

CARE OF PROVIDENCE FOR THE PRESERVATION OF HIS CREATURES, EXPERIENCED IN EVERY COUNTRY OF THE WORLD.

By this time we have become acquainted with the greatest part of the earth; and new regions have, from time to time, been discovered; yet no place has been found where nature does not produce the necessaries of life. We hear of countries where the scorching rays of the sun have destroyed all verdure, and where the eye sees little but mountains and vast plains of sand: and there are countries which seldom experience the light of the sun, or feel the grateful warmth of his rays; where a winter, almost perpetual, torpifies, and where no culture calls to cheerful employment, nor fruits or harvest are ever seen. Yet in these both men and animals exist, without any want of nourishment: the productions that nature has denied them, because they would be either parched by the heat of the sun or destroyed by extreme cold, are supplied by gifts adapted to the nature of the cli-

mate, and suitable for the nourishment of the inhabitants; who collect with care what nature presents to them, and know how to appropriate it, so as to obtain all that is necessary to their subsistence, or essential to their convenience.

In Lapland, the providence of God has so ordered, that what at first seems to be an evil, and certainly is very troublesome to the people, is the means of their support. The Laplanders are infested with innumerable multitudes of flies, furnished with stings, from which they defend themselves by raising in their huts a continual thick smoke, and besmearing their faces with pitch. These insects deposit their eggs on the water, which attract a great number of waterfowl that feed on them, and, being taken by the Laplanders, become their principal source of nourishment. The Greenlanders generally prefer animal to vegetable food, and very few vegetables grow in these sterile countries. There are, however, some plants, of which the inhabitants make great use, particularly sorrel, angelica, and scurvy-grass (cochlearia.) Their principal nutriment is a species of fish called augmarset, much resembling the kind known by the name of miller's thumb. When they have dried these upon the rocks, they constantly use them instead of bread, and preserve them for the winter in large sacks of leather, or wrapped in old garments. In Iceland, where also, because of the intense cold, there is no agriculture, the people eat dried fish instead of bread. The Dalecarlians, who inhabit the northern parts of Sweden, having no corn, make their bread of the bark of the pine and birch, and a certain root which grows in the marshes. The inhabitants of Kamschatka feed on the stem of the acanthus, which they first peel and then eat raw. The natives of Siberia make use of the roots of a species of lily, which they call martagon.

Adorable Father of mankind! how tender and merciful are thy cares for our preservation! With what goodness thou hast distributed to every part of the earth all that is necessary for the subsistence of thy creatures! Thy wisdom knew, before the foundation of the world, the dangers to which the life of man must be continually exposed, and ordained that he should every where be supported. Such relations, connexions, intercourse, and communications, are established amongst the inhabitants of the earth, that people separated by the most distant seas labour for the convenience and support of each other.

We have likewise abundant cause to be thankful that we are so constituted as not to be limited to any particular kind of food, but are capable of using every species of aliment. And let us adore the inexpressible goodness of God, who has permitted us to receive his all-sustaining word; for which, and the various blessings and abundant means of subsistence with which his liberal hand has supplied us, let us offer up praise and thanksgiving with our latest breath, and for ever rejoice in his holy name!

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APRIL I.

HYMN FOR THE COMMENCEMENT OF SPRING.

Praise ye the Lord, who has created the spring, who has adorned the face of the earth! To him belongeth all glory, honour, and power; for he maketh the beings which he has formed happy. The Lord has created, has preserved, and still loves and blesses, this world, the work of his hands: celebrate him all ye creatures!

In those days of felicity when man had not yet rebelled against his Maker, free from the pollutions of sin and its consequences, the earth resembled a paradise. Even now, though deformed by sin, and the reward of sin, we still see the hand of the divine Author, and the earth is still the entrance to Heaven.

The fields, which have so long seemed dead, begin to revive and bloom; every day produces new blessings, and all created beings rejoice in their existence. The face of the earth is renewed; the sky is pure and serene; the mountains, the valleys, and the groves, resound with melody: and the Lord of the creation regards with an eye of mercy all his works.

But the fields are destitute of intelligence, and the irrational part of the creation know not the Being which formed them; man alone rejoices in his God, experiences his existence, and aspires to live for ever in his presence.

Let us celebrate the God of nature; he is nigh unto us: let all his hosts praise him! He is present every where; in heaven, on earth, and in the seas. Let us for ever glorify him and sing his praises; for wherever we are, there also He is, ever near us by his power, his love, and his bounty!

The Lord commandeth the clouds to extend themselves over the fields; he watereth the thirsty land, that man may be enriched by his gifts. He commandeth the hail, the winds, and the dew, to become sources of happiness to mankind.

Even when the tempest rises, and the thunder peals terror through the heart of man, fertility and blessedness spring forth out of the bosom of storms and darkness. The light of the sun returns with increased splendour, and songs of joy and harmony succeed the roaring of the thunder.

It is in the Lord alone we find true happiness; in Him who is the Author of all good, who enables us to derive salvation from the eternal springs of light and truth. And blessed is the mortal who submits to his government with resignation, and who is prepared to leave this world, in the joyful hope of being united to his Father and Creator by the redeeming power of Jesus Christ!

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APRIL I.

ABUSE OF ANIMALS.

Men abuse animals in so many different ways, that it is very difficult to enumerate all of them; and for the sake of perspicuity, I shall at present comprehend them in two classes. They are generally too much or too little valued; and in either case we act with impropriety. On the one hand, we have too little regard for the brute creation, when, presuming upon the authority God has given us over them, we exercise that power with arrogance and caprice. But allowing that we possessed this absolute dominion over them, is it just that we should exert our right with cruelty and tyranny? All who are not the slaves of passion, and are not corrupted by vicious habits, are naturally inclined to have compassion for every being that has life and feeling. This disposition does honour to human nature, and is so deeply implanted in our hearts, that he who has unfortunately stifled it is regarded with aversion, and shows how much he has fallen beneath the dignity of man. He will then have to make but one more step to become a monster; which is, to deny to men the compassion he refuses to brutes.

Experience justifies me in this assertion, and my readers will recollect examples enough of this species of ferocity. History furnishes us with many: we there find that the people who delighted in the combats of animals were remarkable for their cruelty towards their fellow-creatures, so true is it that our treatment of animals has an influence upon our moral character, as well as upon the mildness of our manners. Though it may be urged we have the right of destroying hurtful animals, will it follow that we have a right to tear from them, without compassion or remorse, that life which is so dear to all creatures? or, when necessity obliges us to take such a step, are we justified in taking a pleasure and barbarous joy in their sufferings; and, in depriving them of life, making them suffer a thousand tortures more cruel than death itself? I grant that the Creator has given us animals to serve our necessities, to conduce to our comforts and pleasures, and to relieve our toil by their labour; but it does not thence follow that we are to fatigue them unnecessarily, or to make them labour beyond their strength, refuse them that subsistence which is their due, or increase their sufferings by hard treatment.

This is sufficient to show the nature of the first species of abuse; but some people fall into the opposite extreme. Those animals of a social nature which are most connected with us, which live in our houses, and are continually in our presence, which amuse and contribute to our diversion or utility, sometimes inspire us with a ridiculous and extravagant affection. I am grieved to say that there are both men and women so absurd as to love their domestic animals to such an extravagant degree, as to sacrifice to them those essential duties which they owe to their fellow-creatures. War may send its plagues

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through nations, and whole armies destroy each other, without making any impression upon the lady who, some days after, is inconsolable for the loss of her lap-dog. Much more might be said upon this subject; however, I will not weary my readers with such absurdities, but conclude this meditation with a very important remark. Parents, and those who are entrusted with the care and education of children, in their presence cannot too scrupulously avoid every abuse of animals. It is the more necessary to insist upon this, because the practice of it is very often neglected, and the children, influenced by such pernicious examples, often imbibe the worst of passions. No animal should be put to death in their presence; much less should they be commissioned to perform a task of such cruelty. Let them always be accustomed to treat animals as beings which have life and feeling, and towards which they have certain duties to observe. Whilst we thus prevent their feelings from becoming brutified, let us guard against their being too much attached to animals, to which they are very often much inclined; but let us teach our children the right method of behaviour to this part of the creation, that they may, from their earliest infancy, be accustomed to acknowledge, even in these creatures, the visible impression of the Divine Perfections.

APRIL II.

MOTION OF THE EARTH.

When the delightful spectacle of the rising sun renews each morning in our souls the gratitude and admiration which we owe to the sublime Author of the universe, we may at the same time observe that the situation of this magnificent view changes with the seasons. Thus, if we mark the place where the sun rises in spring and in autumn, we shall find in summer it is more to the north, and in winter more to the south. It is reasonable to conclude that some motion must occasion these changes; and many naturally suppose it is the sun which moves, and thus occasions us to see it sometimes on one side, sometimes on the other. But as the same phenomena would take place though the sun were to remain immoveable and the earth to turn round it, and that we neither perceived the motion of the sun nor that of the earth, we ought to give less weight to our own vague conjectures than to the repeated observations that astronomers have made in the heavens; which sufficiently prove that the rotatory motion of the earth alone effects the changes we remark in the situation of the sun.

In the first place, let us represent to ourselves the immense space in which the heavenly bodies are placed: it is either empty, or contains a very subtile fluid, called ether, in which this globe, and all the planets composing the solar system, move in their different orbits; in the centre of which shines most conspicuously the sun, of whose gran-

deur above all the planetary system we have spoken in a preceding discourse. The gravity which our globe has in common with all other bodies directs it towards the centre, or the sun attracts the earth by the superior force which greater bodies possess over smaller, and by which the latter are attracted; so that, as the earth tends to fly off from the sun, it is counteracted by the superior attraction of that luminary: by this means the earth is made to describe a circle round the sun, somewhat analogous to the curve described by a cannon-ball; which, though it soon falls to the earth, yet might prolong its course for the space of some miles, if it had been projected from the top of a high mountain. Suppose the elevation were still greater, it would fly proportionably farther; continue adding to this imaginary height, and it would go as far as our Antipodes, in order to return to the point whence it set out.

All these effects take place from the laws of gravitation, or the attractive force of our globe; and in this manner is caused the revolution of the earth round the sun. The orbit it describes is not, however, entirely circular, but an ellipsis, in one focus of which the sun is placed, by which arrangement we are farther from that star at one period than at another. This orbit is 44,000 semi-diameters of our earth; and to make its revolution round the sun, the earth employs 365 days, 5 hours, 48 minutes, and 43 seconds, being the space of time which completes our year, after which revolution we find the sun in the same part of the firmament: for in every part of the earth's orbit we see the sun in the opposite side of the heavens, so that though the earth is continually moving, we imagine it is the sun which is in motion. In spring, the sun being equally distant from the two poles, causes the equality of day and night. In summer, it is twenty-three degrees thirty minutes nearer the north, which occasions the greatest length of our days; in autumn, it returns to an equal distance between the poles; and in winter it is as far towards the south as in summer it was towards the north, thus occasioning our shortest days.

Such being the order and the arrangement of the great works of the creation, we have yet additional cause to admire and adore the wisdom and supreme goodness of the Creator. Each new intelligence that we gain of the Father of Nature, by his works, is precious; we every where discover his greatness, and are led to acknowledge that he has perfected all with consummate wisdom. Let us then, with the fullest assurance and the most entire confidence, commit the conduct of our lives to Him who governs all things in the perfection of his wisdom; let us banish all doubt and mistrust, and surmount every fear, by faith in the Almighty Creator of the heavens and the earth; and may we be permitted to call him by the tender appellation of Father, through the redeeming grace of Christ!

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APRIL III.

ABUNDANT RICHES OF NATURE.

To be convinced of the liberality with which nature distributes her gifts, it is sufficient to reflect upon the prodigious number of human beings who receive from this beneficent mother of their support, clothing, and comforts of every kind. But as this daily happens, perhaps the impression made upon our hearts is feeble, or we totally disregard the blessings we are continually receiving: we will therefore now consider those creatures which are partly formed for our use, and some of which are the objects of our contempt. This consideration will teach us, that every creature inhabiting the earth displays the merciful goodness of the Creator; and if our hearts are still susceptible of feeling, must call upon us to glorify his holy name.

Innumerable multitudes of creatures inhabiting the air, the earth, and the waters, are daily indebted to nature for their subsistence. Even those animals which we ourselves feed, properly owe their nourishment to her. The various species of fish all subsist without the help of man. The forests will produce acorns, the mountains grass, and the fields different seeds, without any culture. Amongst birds the most despicable as well as most numerous tribe is that of sparrows; the number of which is so prodigious, that the produce from all the fields of a large kingdom would not suffice for their support during the space of one year. It is nature which takes from her immense magazine what is necessary for their subsistence, and they are only the least part of her dependants. The number of insects is so immense, that centuries may elapse before all their different species shall be known. How numerous are the flies, and how many different species of insects float in the air, of whose stings we often feel the smart! The blood which they extract from us is a very uncertain and accidental kind of nourishment; we may reckon for one insect which is supported in this manner millions which have never tasted of blood, either human or of any other animal. On what then do these creatures live? There is scarcely a handful of earth that does not contain living insects, which are nourished in it by means of one another. In each drop of water creatures are discovered, whose means of existence and multiplication are inconceivable.

Immensely rich as is nature in living creatures, she is not less fertile in the means of supporting them. From her every creature receives its shelter and aliment; for them she causes the grass to grow upon the earth, giving to each the choice of that food which is most suitable to its nature; and none amongst them is so despicable that she disdains to regard it with affection, and refuses to provide for its support. Herein is plainly manifested the power of the Almighty, which effects what all the people of the earth united together could not accomplish. He satisfies every living creature, and nourishes alike the birds of the air and the inhabitants of the waters and the

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earth. And will he do less for man? Whenever doubts and uncertainty arise, let us remember the multitude of beings which God daily supports. Let the fowls of the air, the wild beasts of the desert, and the millions of creatures which do not depend upon the care of man, teach us how to live contentedly. He who adorneth the flowers of the fields with their beauty, who feedeth every animal, surely knows all our wants; and he heareth the prayers of the afflicted, when uttered in the language of faith and purity of heart.

APRIL IV.

SUN-RISE.

Have you ever witnessed that superb spectacle which the rising sun daily affords? Or has indolence, the love of sleep, or absolute indifference, prevented your contemplating this splendid phenomenon of nature? Perhaps you are of that class of beings who prefer the indulgence of a few hours more sleep, to the gratification of seeing the east illumined by the first rays of the sun; or you are of the opinion of those who, satisfied that the sun is present to enlighten and to cheer the earth, never trouble themselves with reflecting upon the cause of such an effect. Or perhaps you are like millions of people who daily see this grand spectacle without emotion, and without forming any idea of it, but who pass it by without regard or reflection. To whichever class you belong, suffer yourself at length to be roused from your state of insensibility, and learn what thoughts the view of the rising sun ought to excite in your mind.

There is no spectacle in nature more grand and beautiful than the rising sun; before which, the most magnificent dress that human art can prepare, the most splendid decorations and ornamental designs of costly palaces, fade away, and are as nothing. At first the eastern region of heaven, clothed in the purple of Aurora, announces the approach of the sun. The sky gradually assumes the tints of the rose, and soon flames with a fiery brilliancy; then the rays of light piercing the clouds, the whole horizon becomes luminous, and the sun opens upon us in unrivalled splendour, gradually rising in the heavens; whilst every creature rejoicing seems to receive new life and being; the face of the earth is smiling, and the music of the birds fills the air; every animal is in motion, and expresses its joy by playful gambols and increased animation.

May the aspirations of my soul be raised to the throne of God, and the songs of my praise ascend up to Heaven, the seat of Him at whose command the sun first rose, and whose hand still directs his annual and diurnal course; from which result the revolution of day and night, and the regular succession of the seasons. Raise thyself, O my soul! to the Father of Glory, and celebrate his majesty; acknowledge thy dependence upon him, and celebrate his praise by

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actions which are pleasing in his sight! Behold! all nature proclaims order and harmonious regularity. The sun and all the stars accomplish their course: each season brings forth its fruits, and every day renews the splendour of the sun; and shall we be the only creatures who neglect to praise the Creator, by the virtue of our actions and the integrity of our conduct? Let the propriety of our lives and the fervency of our piety exalt the goodness of God, and teach the infidel how great and worthy of admiration is that Deity which he professes to despise; and let the peaceful calm and purity of our minds teach the vicious man the beauty of holiness, and the mild and merciful nature of that God before whom he trembles. Let us act towards our fellow-creatures as God does to us, and be to them what the sun is to the whole universe. As he daily diffuses his benign influence over the earth; as he shines upon the ungrateful as upon the righteous; and as he gilds the bosom of the valley as well as the lofty summit of the mountain; so let our lives be useful, beneficent, and consolatory to our fellow-creatures! May each returning day renew the charitable emotions of our heart, and may we do all the good in our power, and endeavour so to live and to act, that our lives shall be a blessing to mankind.

APRIL V.

CURIOUS STRUCTURE OF THE EAR.

Although the ear is less beautiful than the eye, its conformation is as well adapted to its design, and it is equally admirable and worthy of the Creator. The position of the ear bespeaks much wisdom; for it is placed in the most convenient part of the body, near to the brain, the common seat of all the senses. The exterior form of the ear merits considerable attention; its substance is between the flexible softness of flesh and the firmness of bone, which prevents the inconvenience that would have arisen had it been either entirely muscular or wholly formed of solid bone. It is therefore cartilaginous, possessing firmness, folds, and smoothness, so adapted as to reflect sound; for the chief use of the external part is to collect the vibrations of the air, and transmit them to the orifice of the ear.

The internal structure of this organ is still more remarkable. Within the cavity of the ear is an opening, called the meatus auditorius, or auditory canal, the entrance to which is defended by small hairs, which prevent insects and small particles of extraneous matter penetrating into it; for which purpose there is also secreted a bitter ceruminous matter, called ear-wax. The auditory canal is terminated obliquely by a membrane, generally known by the name of drum, which instrument it in some degree resembles; for within the cavity of the auditory canal is a kind of bony ring, over which the membrana tympani is stretched. In contact with this membrane, on

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the inner side, is a small bone, called malleus, or the hammer, against which it strikes when agitated by the vibrations of sound. Connected with these are two small muscles: one, by stretching the membrane, adapts it to be more easily acted upon by soft and low sounds; the other, by relaxing, prepares it for those which are very loud. Besides the malleus, there are some other very small and remarkable bones, called incus or the anvil, os orbiculare or orbicular bone, and the stapes or stirrup: their use is to assist in conveying the sounds received upon the membrana tympani. Behind the cavity of the drum is an opening, called the Eustachian tube, which begins at the back part of the mouth with an orifice, which diminishes in size as the tube passes towards the ear, where it becomes bony; by this means sounds may be conveyed to the ear through the mouth, and it facilitates the vibrations of the membrane by the admission of air. We may next observe the cochlea, which somewhat resembles the shell of a snail, whence its name; its cavity winds in a spiral direction, and is divided into two by a thin spiral lamina: and lastly is the auditory nerve, which terminates in the brain.

The faculty of hearing is worthy of the utmost admiration and attention: by putting in motion a very small portion of air, without even being conscious of its moving, we have the power of communicating to each other our thoughts, desires, and conceptions. But to render the action of air in the propagation of sound more intelligible, we must recollect that the air is not a solid but a fluid body. Throw a stone into a smooth stream of water, and there will take place undulations, which will be extended more or less according to the degree of force with which the stone was impelled. Conceive then that when a word is uttered in the air, a similar effect takes place in that element as is produced by the stone in the water. During the action of speaking, the air is expelled from the mouth with more or less force; this communicates an undulatory motion to the external air which it meets; and these undulations of the air entering the cavity of the ear, the external parts of which are peculiarly adapted to receive them, strike upon the tympanum or drum, by which means it is shaken, and receives a trembling motion: the vibration is communicated to the malleus, the bone immediately in contact with the membrane, and from it to the other bones; the last of which, the stapes or stirrup, adhering to the fenestra ovalis, or oval orifice, causes it to vibrate; the trembling of which is communicated to a portion of water contained in the cavity, called the vestibulum, and in the semicircular canals, causing a gentle tremor in the nervous expansion contained therein, which is transmitted to the brain; and the mind is thus informed of the presence of sound, and feels a sensation proportioned to the force or to the weakness of the impression that is made.

What great cause we have to rejoice in possessing the faculty of hearing! for without it our state would be most wretched and deplorable; in some respects more sorrowful than the loss of sight. Had we been born deaf, we could not have acquired knowledge sufficient

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to enable us to pursue any art or science. Let us never behold those who have the misfortune to be deaf, without endeavouring better to estimate the gift of which they are deprived, and which we enjoy, or without praising the goodness of God, which has granted it to us; and the best way we can testify our gratitude is to make a proper use of this important blessing.

APRIL VI.

THE MILKY WAY.

If we observe the heavens during a clear night we discover a pale irregular light, and a number of stars, whose mingled rays form the luminous tract which is called the Milky Way. These stars are at too great a distance to be perceived by the naked eye; and amongst those which are visible with a telescope, there are spaces apparently filled with others in immense numbers, though not distinctly perceptible through a telescope. Though the number already discovered is prodigious, if we could make our observations from another side of the globe, nearer to the antarctic pole, we should be able to make still more discoveries, and see a number of stars which have never appeared upon our hemisphere; and yet we should not even then be able to discover the half, or the thousandth part, of those radiant bodies which shine in the immense firmament of heaven.

All the stars which we perceive in the milky way appear no more than so many luminous points, though each one may be much larger than the whole terraqueous globe. If we use instruments of the utmost power, they never appear larger than when seen by the naked eye. Were an inhabitant of this earth to ascend into the air one hundred and sixty millions of miles, the fixed stars would still appear no larger than luminous specks. Incredible as this assertion may appear, it is not a chimerical idea, but a fact which is effectively proved; for about the 10th of December we are more than one hundred and sixty millions of miles nearer the northern part of the heavens than we are on the 10th of June; and yet we never perceive any increase of magnitude in the stars.

The milky way, though little, compared with the rest of the heavens, is amply sufficient to manifest the grandeur of the Supreme Being; and each one of the stars we there discover display the wisdom and goodness of the Almighty. And what are these stars in comparison of the immense number of worlds revolving in the firmament of heaven? Reason herself is confounded in the contemplation, and lost in admiration; we can only wonder and adore.

Often, then, as we behold the starry sky, let us raise our souls to thee, O adorable Creator! and confess with shame how seldom we have thought of thee; how little we have reverenced thy grandeur or praised thy majesty! Pardon our insensibility, and forgive our in-

gratitude, O God! Loose these souls bound by earthly ties, and raise them to thyself, O Creator of heaven and earth! Suffer us to humble ourselves at thy feet, deeply convinced of our littleness and unworthiness! Then may we be comforted in our contrition with the glorious hope, that our redeemed souls will hereafter soar beyond the region of the stars in endless felicity!

APRIL VII.

GERMINATION OF PLANTS.

The vegetable kingdom is a vast field, where the attentive observer may contemplate the boundless power and omnipotent wisdom of the Creator. Though we should live upon the earth for the space of a hundred years, and though we were to dedicate every day to the study of a particular plant, at the end of our career there would still remain many things that we had not perceived, or had not been able sufficiently to observe. Let us reflect upon the production of plants, and examine their internal structure, and the conformation of their different parts; let us reflect upon the simplicity and diversity discoverable in them, from the least blade of grass to the most lofty oak; and endeavour to become acquainted with the nature of their growth, the manner in which they are propagated, how they are preserved, and the different properties by which they are useful to the animal creation. Each of these articles will sufficiently employ our faculties, and teach us the infinite power and merciful goodness of the Creator. We shall every where discover with admiration the most wonderful order and incomprehensibly beneficial designs.

Though we were to know no more of plants than the phenomena which every eye may distinguish; though we only knew that a grain of corn, when sown in the earth, at first shoots forth a root into the soil; then a stem upwards, which pierces the surface, and bears branches, leaves, and fruit, in which are included the germs of new plants; we should yet discover sufficient to convince us of the profound wisdom of the Creator. Let us attentively consider all the changes which a grain of wheat undergoes in the earth: it is sown at a certain time, which is all we can do to assist its progress; but nature is more active. As soon as it has acquired the necessary degree of humidity from the earth, it swells; the external coat or skin which concealed the root, stem, and leaves, opens; the root bursts forth and penetrates into the earth, where it derives nourishment for the stem, which now makes an effort to raise itself up above the surface of the ground. When it has sprung up, it gradually increases till it has arrived at its proper height; it then unfolds its leaves, which at first are white, then yellow, and at length are tinged with a beautiful green. If we confine ourselves to the examination of this grain of corn, so necessary to our subsistence, what admirable wisdom we

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shall observe! Immediately as the tunic which enclosed the germ is rent, and the root has penetrated the earth, the stem ventures to spring up in the form of a fine and delicate filament, which, however feeble it may appear, is able to contend with the inclemency of the air. It gradually increases in size till it produces the ear of corn, the sight of which is so grateful, and where the fruit is enclosed in leaves which serve as a sheath till it is strong enough to break through them.

The fields where corn is sown may serve to remind us of fields sown with a very different kind of seed. We may regard our bodies, when quietly deposited in the earth, as seeds which are to spring up and be matured in eternity. We have as little reason to expect that a grain of wheat placed in the ground will produce an ear of corn, as that our bodies reduced to dust shall become glorious bodies of light and immortality. The time will come, when the seed shall unfold itself, our dust will be reanimated, and the righteous will live in Christ. In that great day, what will become of you who despise our faith? It is true, our bodies must dissolve and turn to dust; but they will not always remain under the influence of death. The soul of the just man made perfect will repose from the labours of this life, in the bosom of his God, full of happiness and adoration. Eye has not seen, nor ear heard, neither hath the imagination of man conceived, a state of salvation so blessed and glorious as this!

APRIL VIII.

THE AZURE COLOUR OF THE SKY.

To judge from the first impression of our senses, we might suppose that the heaven above us was an immense vault of blue studded with brilliants; such an opinion, however, will only be retained by the most ignorant of men, though many with some title to understanding have very absurd notions of the sky. The reason why it appears of an azure colour is to be ascribed to the atmosphere not being perfectly transparent. Were it possible to ascend very high above the surface of the earth, the air would be found much more rare, till, if we were to ascend still higher, it would become incapable of assisting in respiration, and at length would entirely cease, when we should have reached the region of pure ether.

The higher the mountains are which we ascend, the lighter does the atmosphere become, and the azure colour of the heavens fainter. And if it were possible to ascend to the regions of pure ether, the blue colour would entirely disappear, the sky would appear black as night; for so do those objects appear which do not reflect the rays of light. Consequently, if the air which surrounds us was as transparent as ether, the sky could not appear blue. The air is filled with innumerable minute particles, which, when illumined by the sun, receive a motion, in consequence of which new rays are produced; and those

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particles, of themselves obscure, become visible to us when they are thus illumined. Their colour is blue; hence a forest, which appears green when we are nigh to it, seems to be more and more blue as we recede from it. However pale and subtile are the blue rays of air, so many of them strike upon our eyes at the same instant, that they produce all the effects of a dark blue.

What has now been advanced may induce us to consider the heavens in a different point of view than we have hitherto done. From it we may conclude, that there is not a phenomenon in nature, not even the colour of the sky, in which we do not discover order, utility, and some certain end. If green is the most agreeable colour that could be chosen to beautify the earth, the azure of the heavens is no less beautiful and pleasing. How dreadful is the aspect of heaven, when storms rave and tempests lower! But what a beauty and simplicity is seen when it is in a state of serenity and repose! The charms it presents increase the longer we contemplate it, and we are never weary with the pleasing view; the rejoiced soul raises itself to the Being which has thus adorned the heavens, and swells with grateful joy in the contemplation of his power displayed in beauty.

APRIL IX.

NECESSITY AND USE OF AIR

The earth is surrounded by a fluid, called air, which materially contributes to its life, beauty, and preservation. All the changes we observe in the different beings upon our globe depend upon the air. It is essential to the existence of animals, for few of them can survive a minute's privation of this fluid. Not only land-animals, and those which inhabit the air, cannot live without it; but those which dwell beneath the waters equally require a renovation of air. That birds may be enabled to fly, they must be supported by the air; and on this account we find their lungs are so constructed, that the air can pass by orifices into their bodies, and their bones are cellular or porous; by which means they are much lighter, and more easily float as well as fly in the air. Plants also require air to forward their growth and vegetation: hence they are provided with numerous vessels for its reception and transmission.

Nothing is more easy than to enumerate proofs of the necessity and use of air; we shall at present confine our attention to one only, which will sufficiently illustrate our assertion. If air did not exist, there would be no twilight before sun-rise; the sun would suddenly flame above the horizon bright as at noon-day; its aspect would not be changed till the moment in which it disappeared to leave us in total darkness. It is true, the sun would strike us with a most vivid light though there was no air, but it would resemble a fire blazing during the night in an open country: it would in some sense be day,

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whilst the sun and the objects which immediately surround us were visible; but all the rays which fell on bodies placed at a certain distance would be reflected in a right line, and lost in the extent of the heavens. Thus, though the sun was placed immediately over our heads, we might yet experience a sort of night, if the atmosphere did not intervene between us and the luminary.

To recapitulate then all the advantages which the air produces to our globe: it preserves life, as being the principle of respiration to living creatures; through its medium winged animals fly, and those which inhabit the waters are enabled to swim; it serves for the propagation of sound, and conduces to the formation of vapours, rain, and wind; it is essential to the fertilization of the earth, favours the vegetation of plants, and by its agitation disperses the noxious vapours which exhale from different bodies. If air did not surround our globe, the light and heat of the sun would be insufficient for our purposes; sounds could not be transmitted, consequently our organs of speech would be useless: in short, the advantages which the air produces to the human race are without number; and if we accustomed ourselves to contemplate with an attentive mind this great agent of nature, we should be more and more led to exalt the works and the glory of God. If any have hitherto neglected this pleasing duty by having taken only a superficial view of the creation, and whilst they enjoyed the blessings of nature their hearts have not bowed before the presence of God, I beseech them, as they value their own happiness and well-being, to endeavour in future to become attentive spectators and observers of the works of God; for they who consider them with attention, and investigate them with ardour, are rewarded with a pleasure pure and unceasing: the study of nature is a source of everlasting joy, the springs of which never fail.

APRIL X.

DIVERSITY OF SOIL.

The soil of the earth is not the same in all places; the upper bed is generally formed of a black, friable, and rich earth, which being mixed with the remains of plants and animal matter, becomes the nourishing parent of the many thousands of vegetables which enrich our globe. This bed often varies in quality; at one place it is light and sandy, at another clayey and heavy; sometimes it is moist, sometimes dry; here warm, and there cold. Hence we find that plants, and herbs, which in some countries grow spontaneously, in others will not succeed without art and cultivation; and this diversity of soil is also frequently the cause why vegetables of the same species differ amongst themselves, according to the nature of the soil in which they grow. In this the wisdom of the Creator is conspicuous: if all soils were alike, and possessed the same qualities and constituent

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parts, we should be deprived of many thousands of vegetables, as each species of plants requires a soil analogous to its nature. Some require a soil which is dry, others one that is moist; to some warmth is necessary, and to others cold; some flourish better in the shade, whilst others only expand in the sun; some again thrive on mountains, whilst the greater number prefer the valleys. Hence it happens that every country has a certain number of plants peculiar to it, and which do not thrive so well in others. If the elder is transplanted into a sandy soil, and the willow into one which is dry and rich, it will be found that neither will succeed so well in a soil different from that to which it has been accustomed. Thus nature provides for each that soil which is best adapted for its culture, each species growing in the soil most analogous to its constitution. It is true, that art often forces nature to produce according to our wishes; but the effects of this opposition do not always repay our trouble and expense, and nature, in the end, is found superior to all the researches of skill and operations of art.

As the soil is infinitely varied, so also is the character and disposition of men. There are some whose hearts are too insensible to profit by instruction, whom no motive affects, whom no truth, however forcible and evident, awakens from their stupidity. Such a character may be compared to a stony soil, which alike resists the temperature of the air, and the assiduity of culture: a character little superior is that where continual levity predominates. People of this class may receive the salutary impressions of religion and piety; but, if the least obstacle impedes, they are discouraged, and their zeal vanishes as quick as their good resolutions. Such as these are those timid and frivolous people who reject truth because they are afraid to receive it, and in whom piety cannot take root because there is no depth; they resemble the light and dry soils where nothing arrives at maturity, where the scorching heat of the sun dries up every thing, because the soil does not afford the succulent juices necessary to the nourishment of the plants. Happy are they in whom, as in a rich soil, the seeds of virtue mature into an abundant harvest of choice fruits!

On this diversity of disposition, among men, depends more or less the effect which the sacred word produces in their hearts. In vain may the sower sow the best seed, and useless will be his care, if the soil which receives it has not the requisite qualities: the excellence of the seed can never alter the sterility of the soil; which, if so hard and unyielding that the seed cannot enter, or so sandy that it cannot take root, or so stony as to choak it up, will never bring forth good fruit. To whichever class we may belong, whether the impenetrable hardness of our hearts resists every impulse, or the frivolity of our disposition admits of no steady pursuit, we shall readily acknowledge that before the seeds of truth and of virtue can ripen into maturity and produce fruit, before we can attain the enjoyment of felicity and blessed peace, our hearts must be changed. To effect which must be the work of the Holy Spirit; and may the Almighty, in his condescension, assist and enable us to become like the fruitful soil, and

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faithful to our vocation, bring forth abundance of fruit, that, rich in good works, we may preserve the gift of his grace in a good and generous heart.

APRIL XI.

NECESSITY OF REPOSE DURING THE NIGHT.

Labour is useful and necessary to man; upon it depends much of the happiness and convenience of life, and every one, according to his state and condition, should apply himself to it. But by incessant exertion human strength would be speedily exhausted, and man would become incapable of using his bodily powers, or of exerting the faculties of his mind, if nature did not, by continually supplying him with new vigour and activity, enable him to fulfil the duties of his vocation. As we daily lose a portion of our nutritious juices, we should soon become exhausted, and suffer a fatal consumption, was not our vitality continually renewed. This is supposed to be effected, and the ability to labour supported, by a matter inconceivably tenuid and penetrating, secreted from the blood, and called the nervous fluid, which supports the action of the brain and muscles. But the continual dissipation of this fluid would soon exhaust it, and man would become languid and enfeebled, unless the waste was continually repaired.* If the body was kept constantly in a state of action, our aliment could not be digested, nor its nutriment be regularly distributed to every part.

It is necessary then that the labour of the head, as well as the exertion of the body, be for a time suspended, that our wearied nature may regain strength and vigour. Sleep renders us this important service: as night approaches, the powers which have been exerted during the day diminish, our vitality seems to be weakened, and we are irresistibly urged to sleep; during which state, when the activity of thought and the labour of our hands have ceased, our fatigued body acquires new force and fresh vigour. This renovation is as necessary to the body as to the mind; by it our limbs are rendered capable of the greatest alertness, and our mind is enabled to undergo new exertions by its increased activity and the reanimation of all the intellectual faculties.

How culpable are those who, from trifling views, a sordid interest, or the gratification of their passions, deny themselves the necessary portion of sleep! They interrupt the order of nature, which has been established for their good; they destroy their gayety of heart, enervate their bodily strength, and hasten the short period of their existence by inducing a premature old age. Why should we be so foolish

* Whatever is the cause of that excitement which stimulates to action, or of the renovation of exhausted strength, the nervous fluid so much talked of has never been discovered; we merely know that the nerves are essential to sensation and life.—E.

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as to deprive ourselves of a blessing which the bountiful favour of Heaven bestows upon all descriptions of men, upon the poor as well as the rich, upon the learned as upon the ignorant? Why should we shorten our days by refusing the gift which nature offers of prolonging our life by the renovating repose of sleep? The nights may come, when, far from enjoying the sweet refreshment of sleep, tossing on the bed of anguish, we shall be counting the tedious hours as they heavily pass over. Few know or estimate the value of sleep till they have wished for it in vain: and there are nightly many thousands of human beings who, afflicted with diseases or mental agitation, know not the blessing of this sweet restorer of nature.

APRIL XII.

MAGNITUDE OF THE EARTH.

To determine the exact size of the earth is attended with considerable difficulty: though there is in fact but one longitude, there are two latitudes, the north and the south, both beginning at the equator; the one extending as far north as the arctic pole, the other south to the antartic pole. No one has yet been able to penetrate as far as either pole: for the mountains of ice in Greenland, and the northern sea, have always impeded on the north: and the south is not more accessible. However, by the labours of geometricians, we are enabled pretty nearly to ascertain the dimensions of our globe; and according to the most exact calculations, the surface of the earth contains 199 millions, 512 thousand, 595 square miles. The seas and unknown parts, by a measurement of the best maps, contain 160 millions, 522 thousand, and 26 square miles; and the inhabited parts 38 millions, 990 thousand, 569 square miles, in the following proportion:—Europe 4 millions, 456 thousand and 65; Asia 10 millions, 768 thousand, 823; Africa 9 millions, 654 thousand, 807; America 14 millions, 110 thousand, 874;* which calculations prove that scarcely a third part of the globe is inhabited.

It has been calculated that there might be at least three thousand millions of men upon the earth at once, whilst in reality there are no more than one thousand and eighty millions: of which there are in Asia 650 millions, in Africa 150, in America 150, and in Europe 130 millions. Supposing then that the earth is inhabited by about one thousand millions, and that thirty-three years make a generation, it would follow that in the above space of time a thousand millions will die; consequently the number of those who die upon the earth amounts each year to 30 millions, every day to about 83,400, every hour to 3,475, and every minute to about 57. This calculation is very striking, and will naturally suggest the idea, that since the mor

* Ferguson's Astronomy.

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tality of each year, and even of each minute, is so great, it is very probable that we may ourselves very soon increase the bills of mortality. At this very instant some one of our fellow-creatures has paid the debt of nature, and ere the lapse of another hour above three thousand more beings will have bid a final adieu to this state of existence. These considerations are awful, and should lead us to the most serious reflections; they should frequently induce us to reflect upon death, and prepare for eternity.

Immense as the earth may appear, its magnitude sinks into nothing when compared with those spheres, which revolve in the heavens; in comparison of the whole system of the universe, it is no more than as a grain of sand is to the most lofty mountain! How this thought raises my conceptions of the inexpressible grandeur of God, the infinite Creator of the heavens and the earth, in comparison of whom this world, and all the worlds we can conceive, with their multiplied inhabitants, are lighter than chaff before the wind, and of less account than the atoms playing in the sun-beams!

APRIL XIII.

GENERATION OF BIRDS.

About this season of the year nature undergoes a general revolution, highly interesting and well deserving of our attention. This is the time when the joyful birds begin to build their nests and bring forth their tender young; an operation which, though renewed every year, is little regarded.

In each impregnated egg that has not yet been sat upon, a small spot is observed on the yolk, in the centre of which spot is a white circle extending upwards, and appearing to join some small vesicles. In the middle of this circle is a sort of fluid matter, in which swims the embryo of the future chick. It is composed of two lines or white threads, which sometimes appear to be separated from each other at their extremities, and between which a liquid substance is seen of a leaden colour. The extremity of the embryo is contained in a vesicle or small bag, surrounded by a ligament, in which the navel afterward appears. The ligament is partly composed of a solid yellowish matter, and partly of a brown fluid, which is also surrounded by a white circle. These are the chief things observable in an impregnated egg before incubation.

When it has been under the hen about twelve hours, there appears in the lineaments of the embryo a humid matter, which has the form of a little head, and on which vesicles are seen that afterwards form the vertebræ of the back. In thirty hours the place of the navel appears covered with a number of little vessels, and the eyes begin to be distinguishable. The two white threads, which in uniting have left still some space between them, enclose five vesicles, which are

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the matter of the brain and spinal marrow. The heart may next be observed, though it has not been ascertained whether the heart or the blood is first formed. However this may be, it is certain that the rudiments of the chick existed in the impregnated egg before incubation; and when it has been some time sat on, the vertebræ, the brain, the spinal marrow, the wings, and part of the muscles, may be distinguished before we can perceive the heart, the blood, and the vessels. In thirty-six hours the navel is covered with a number of vessels, separated from each other by unequal spaces. The essential parts of the chick being thus developed, it continues to grow larger, and the parts become more distinct, till, in about twenty or one-and-twenty days, it is strong enough to break the shell in which it was enclosed.

We owe these discoveries to those naturalists who, by the assistance of the microscope, have hourly watched and remarked the progressive formation and development of the chick. However, notwithstanding all the information we have derived from their observations, there still remain many mysteries which elude the most penetrating researches. How does the embryo gain entrance into the egg? and how does it acquire, by means of heat, which is all that it receives from the hen, life and growth? What power first puts in motion the essential parts of the chick, and what is that vivifying spirit which, penetrating through the shell, stimulates the heart into action? Who has inspired the birds with that instinct which teaches them to continue their species, and inform them their offspring is contained in the egg, upon which they patiently sit and endure every hardship during the period of incubation?

To these questions we can only answer with certainty, that as nothing can be attributed to blind chance, we look for the cause in the wisdom of God, which has ordered that some animals should not arrive at perfection till after they have left the womb of their mother, whilst others remain in it till all their parts are formed; and he who does not discover in the generation of birds the proof of a Superior Being, will perceive it nowhere. O man! spectator of the glorious works of God, adore with me his marvellous wisdom, and see, even in the meanest objects, the impress of his ineffable goodness and power. He has created the birds of the air for thy advantage, pleasure, and nourishment.

APRIL XIV.

PROGNOSTIC SIGNS OF THE WEATHER.

Winds, heat, cold, rain, snow, fogs, drought, and many other changes in the temperature of the air, do not always depend on certain and regular causes. There are, however, some signs in nature which often indicate the kind of weather about to take place. The

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position of our globe with respect to the sun, which is known to us by the four seasons of the year; the changes of the moon, the period of which can be exactly determined; the influence which these heavenly bodies and the different planets in our system have upon the temperature, the agitation, and the serenity of the air, are immutable, and on them prognostics respecting the weather may be reasonably founded. The consequences drawn from these are less to be contemned, because they are established upon truth and confirmed by experience. From analogy we have a right from the past, under similar circumstances, to judge of the future. It is true, a thousand contingencies may affect the temperature of the air with changes as great as they were unexpected; but we must remember that these accidental circumstances seldom exist for a length of time, and though they may occasion considerable alteration in the ordinary course of the weather, they only remain for a short space, and their operation is very limited: whilst, on the contrary, the changes of weather generally follow a certain order, governed by certain rules; and the attentive observer of nature, by comparing the experience of several years, will often be able to foresee them.

We seldom err when we suppose that the north and east winds will bring cold, the south wind heat, and the west rain; and that during the north-west wind it rains in summer and snows in winter. We may also conjecture with probability, that when the morning sky is red, there will be wind or rain in the course of the day; and that a sky tinged with streaks of red in the evening, promises fair weather the following day. From the weather of spring we anticipate that of summer: if in the former we experience much fog, we may expect a wet summer; if in the spring there are great floods, we may be apprehensive in the summer of violent heats and multitudes of insects. When storms have been frequent in spring, we have no reason to fear the return of hoar-frosts.

But supposing that we had no power of predicting the weather, we might still be perfectly easy on that head: the variations of weather, considered as a whole, depend upon fixed laws established by the Creator from the beginning of time; and we may with certainty assure ourselves, that, however unfavourable it may seem, every change of weather is advantageous to the earth, and contributes to its fertility. Let us, then, in every alteration the temperature of the air undergoes, repose in confidence upon that God, who never acts but wisdom and mercy mark his progress: whose every dispensation is wise and beneficent, whether he rides in the whirlwind and directs the storm, or smiles in the beauty of serenity. All his ways declare his goodness, and all his paths display his glory; wisdom and benignity manifest him in all his works, and the continued experience of his benevolence evinces his heavenly care and fatherly love. Let us for ever bless and adore, whilst we admire with awe, the sublimity of his grandeur, and the incomprehensibility of his mercy; and from generation to generation let every one enjoying the breath of life sing his praise and exalt his name.

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APRIL XV.

POSITION OF THE SUN.

The sun is placed by the Creator in that part of the heavens which is best adapted to its nature, and to the great offices it performs. It possesses a determinate volume, and is placed in a space proportioned to the motion it was appointed to execute. It is fixed at a proper distance from those planets upon which it is to act; and this position, arranged so many thousand years ago, he has retained uninfluenced by the wreck of empires and the revolutions of ages. Nothing short of infinite power could have effected such a miracle; nothing less than an Almighty God could have created this immense globe, placed it in a suitable situation, defined its limits, determined its motion, subjected it to invariable laws, and preserved it through the lapse of ages in that position and order which in the beginning he had prescribed to it. And the wisdom and advantages of this arrangement, whether we consider this earth alone or the whole system of worlds encircling the sun, the experience of centuries amply testify.

The burning rays that issue from a globe of fire a million times larger than the earth, must be inconceivably active, if in falling they continued close to each other: but as they separate more and more in proportion as the distance from the common centre increases, their force will be diminished in the ratio of their diverging. Had our earth been placed in a point where these rays acted upon it in a greater number, or at a less distance, the intensity of the heat could not have been endured; or had it been thrown to the very extremity of the solar system, it would have received only a faint light, and not warmth enough to ripen its fruits and ordinary productions. The sun then is placed in that part of the heavens where it can be most beneficial, by which it communicates to our world a light and heat sufficient to penetrate and vivify the earth by its salutary rays, rarify the atmosphere, and produce all those happy effects without which we should neither receive the benefits of dew and of rain, nor the blessings of clear and serene days. But arranged as it is, it causes the alternation of day and night, and the vicissitudes of the seasons.

It is not to the sun only, but to every planet and star that shines in the firmament, that God has allotted a place suited to its nature and adapted to the ends it has to perform in the creation. Every human being has likewise a place assigned him in the creation and certain duties to fulfil. And may we each attempt to act in our station, and perform the duties there allotted us, with as much exactitude and fidelity as that with which the sun throughout his course discharges his important functions, according to the immutable laws prescribed to him from the beginning of his creation! As the sun imparts his blessings freely to the whole earth, and all created beings; so let every one, according to his power and capacity, exert himself for the good of mankind, share and divide with his fellow-creatures

the advantages he enjoys, communicate to the ignorant the knowledge which he may have acquired, impart strength and comfort to the feeble, and bountifully distribute to the indigent those blessings which the favour of Heaven has granted to him. The man who thus acts may feel a confidence that he is in some degree answering the great end of his creation.

APRIL XVI.

THE PERMANENCY OF CORPOREAL BEINGS.

Nothing perishes in nature; from the beginning of the world to the present period not a single atom has been annihilated. The first groves produced by the power of God were clothed with rich verdure and beautiful leaves: these withered, fell, and ceased to be leaves; but the particles of which they were composed remained, and were converted into dust, clay, or earth. The matter of which the first leaves and herbs were formed still exists, and has lost none of its essential parts; and the constituent part of the plants, which now flourish, will exist whilst the world shall endure. It is true the wood which we burn ceases to be wood; but its particles do not cease to exist, being dispersed into ashes, soot, and smoke. And though nature is subject to constant changes, every thing that is decomposed is regenerated, and nothing finally perishes.

We must not always judge from appearances: when revolutions and convulsions agitate the face of nature, we are induced to believe that many beings are totally destroyed: but this is an error; they are only differently modified, and become the materials which enter into the composition of other beings. The water which exhales in steam and vapour is not lost; it only leaves one place to increase in another. Thus what from want of information we regard as being entirely destroyed, has only undergone a change of parts; and the world, considered in the whole, is now what it was in the first day of its being, though many of its component parts have experienced very considerable alterations.

These considerations may induce us to reflect upon the revolution our bodies must undergo in the grave; though they will entirely dissolve into dust, they will not be annihilated, but their component parts will continue to exist. The conviction of this truth may fortify us against the fear of the grave and the dread of corruption, whilst it will strengthen our belief in the resurrection.

'Why then shall my heart sink at the thought of the grave, or my mind suffer from the terror of annihilation! What is deposited in the tomb is not the only possession we have worthy of our regard and solicitude; it is merely the earthly tabernacle, which returns to its native dust, whilst the soul is incorruptible and endures for ever.'

From the continual duration of corporeal particles, we may ra-

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tionally conclude that the soul also is immortal. Seeing that none of our earthly parts can be annihilated, can we suppose that our souls should be the only created thing which shall perish? Impossible! Sooner would the whole material world sink into annihilation, than one soul which has been redeemed by Christ Jesus should perish.

APRIL XVII.

ADVANTAGES OF RAIN.

Rain is truly a gift from heaven, by means of which the blessings we receive from God are equally manifold and indispensable. Widely desolating as the effects of a continued drought would be to us, as extensively beneficial are the refreshing effects of showers upon the earth. Who can describe or even know all the advantages which result from them? Though we may not be able to describe all, we may at least consider some of the principal benefits afforded by rain.

The heat of the sun acts without interruption upon the earth and the different bodies upon its surface, and continually detaches from them subtile particles which fill the atmosphere in the form of vapour. We should inspire along with the air those dangerous exhalations, if they were not from time to time precipitated by rain, which, by drawing them down upon the earth, purifies the air. It is not less useful to us in moderating the burning heat of the atmosphere; the reason of which is obvious, for the nearer the air is to the earth, the more it will be heated by the reflection of the sun's rays, and the farther it is from the earth the colder it becomes. The rain which falls from a high region brings a refreshing coolness to those below, the agreeable effects of which we experience as soon it has fallen. To rain is partly owing the origin of fountains, wells, lakes, rivulets, and rivers. Every one is acquainted with what abundance these different waters are supplied in humid and rainy seasons, whilst during a long drought they evaporate and become dry.

But in order to estimate the utility and necessity of rain, we have only to observe how the earth and the different species of vegetables all languish for want of the fertile showers, which, when they have fallen, produce new life and reanimated beauty. Rain is in some respects the aliment of vegetables, and without it they would all perish: it moistens and softens the earth, which would otherwise become dry and hard from the action of the sun; it circulates in the minute vessels of plants and trees, and conveys to them those nutritious juices which support their life and promote their increase. When it washes the mountains it detaches from them a soft, rich, and friable earth, which it deposits in the valleys where it falls, and thus contributes to their fertility.

Thus we find every thing is arranged for our advantage, and the whole earth is filled with the bounty of Heaven. Such will be the

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conclusion that every thinking mind will draw from the above meditation: and still more to excite the adoration and praises of the Creator, I shall add some other reflections inspired by the subject of which we have been treating, and which I hope will make some impression upon the minds of my readers.

What spectacle is so noble as the azure vault of heaven viewed upon a calm serene day? Our hearts rejoice, and we regard it with admiration, till the thick clouds gather and darken all its beauties. This ought to teach us, that however admirable were those charms which we had just contemplated with such delight, there are others which are infinitely greater, which no cloud can obscure or conceal, and which will amply reward us for the privation of every other. What then are all the beauties of nature united, in comparison of the lustre of that Being, the contemplation of whom will create the felicity of eternity, and form the chief delight of immortal spirits!

If at any time we are deprived of those things which cause our greatest pleasure here, we are more disposed to search in almighty goodness for that joy and felicity which we could not find in the perishable things of the world. And often those very privations which we regret are productive of essential good. The clouds which sometimes veil the beauty of the heavens are the sources of those refreshing showers which fertilize the earth. When misfortune hangs heavy upon your soul, and adversity darkens your horizon; when your days are passed in tribulation and sorrow; remember there is an all-seeing Providence, who regards you as his children, and in the midst of evil is still working your good. Let us ever cheerfully submit to the dispensation of God, who never acts but mercy tempers his justice, and wisdom regulates his motions; and he alone knows how to distribute his benefits, and where to shower down his blessings. At his command the clouds come from afar to execute his will, and who else shall dare to direct their course? Let no one then show his folly and impiety in arraigning the wisdom of Providence, and disputing the infinity of God!

APRIL XVIII.

OF RESPIRATION.

Respiration is the most principal and essential function of animal life: without it we could not exist; and speech and the various modulations of voice could not take place. It assists us in smelling, and imparts the beautiful florid colour to the blood, whilst at the same time it renews its vitality. But whence does this great source of life proceed? How is it that we breathe? The lungs are the chief organs by which we are enabled to inspire and expire the air. This viscus something resembles a bag, to the upper part of which is attached a tube, through which the air enters, and is distributed

throughout the substance of the lungs by an immense number of minute ramifications of vessels. When the air is received into the lungs, the abdomen is distended, the ribs expand, and the lower part of the sternum or breast bone advances forward. When we expel the air in the act of expiration, the abdomen is drawn in, the ribs are depressed, and the sternum retires towards the back.

To facilitate these operations, nature has admirably arranged the internal parts of the body; numerous muscles are continually employed during the act of respiration in dilating and contracting the cavity of the chest. The structure of the wind-pipe is very remarkable; at the upper part the entrance is defended by a valve, which during deglutition closes, and thus prevents any particles of matter entering to interrupt respiration and destroy life. The lower portion of this organ is equally curious, whether we consider the branches of the wind-pipe ramifying through the lungs, or the distribution of the veins and arteries which accompany them, that the blood they contain may receive the beneficial influence of the air.

Let us then bless the God of nature who has not only given us the faculty of respiration, but continues to preserve it free from interruption. How grateful ought we to be for such a merciful preservation, when so many accidents, without the protection of Providence, might destroy this source of life! Respiration is one of those blessings which we every moment enjoy, which claims all the gratitude we are capable of feeling, and which merits our constant attention; for were we more frequently to meditate upon the favours we daily receive from God, we might be enabled to contemplate with more profit and delight the whole of the creation. And may the great God of heaven, in whose hands are our lives, our breath, and all that we enjoy, be pleased to inspire our souls with those sentiments which dignify our nature, and give us the power as well as the will to celebrate his infinite goodness, and glorify his name by the purity of our actions!

APRIL XIX.

PROOFS OF THE GOODNESS OF GOD DERIVED FROM THE WORKS OF NATURE.

The most frequent and most striking phenomena which we see, either on the earth or in the air, have a manifest tendency to promote the advantage and the utility of the animal world. All that we see around us, above our heads, or beneath our feet, conduces to our comfort and to our pleasures. What is more necessary for the preservation of our life than food? and we find the earth every where covered with alimentary matter. Herbs, grain, and fruits, the support of man and beast, are so abundantly diffused over the surface of the earth, that there is scarcely any part of it where animals may not find suitable nourishment. God has not confined his bounty merely to provide

for our subsistence and to relieve our necessities; he has condescended to give us every thing that can contribute to our comfort and convenience. If it was only necessary that our lives should be preserved, water and common roots would be sufficient; but we are provided with a variety of aliment in a most liberal profusion: we do not experience in the Creator a rigid economist, who distributes to his dependants barely sufficient to preserve them from famishing; but we meet with a profusion of generosity and an abundance of gratifications.

Such is the munificence of God, that there is scarcely upon the face of the whole earth a single tree, herb, or plant, a lake, river, or marsh, that does not supply some living creature with shelter and nourishment. In a tree, for instance, are contained (besides the fruit) bark, leaves, and wood; and each of these parts supports an infinite multitude of creatures. Caterpillars and various insects feed upon the leaves; others upon the bark and wood; and there is nothing in nature that is not useful to some species of animal. How benevolent is that God who never forgets any of the creatures his hands have made, and who ever condescends to watch over and provide for their necessities.

'What is more pleasing than the light,' (said the Wise Man.) 'Truly the light is sweet, and it is a pleasant thing to see the sun,' whose rays illumine the immense space of heaven, and through the day enlighten the earth. Light discovers to us all the riches of nature, which without it would be a desert, and all its beauties would remain unknown. How graciously God has provided for the pleasure of our senses! He has chosen the softest and most beautiful colours to please and gratify the sight: experience teaches that those surfaces which reflect the blue and the green rays produce the least injury to the eyes, which can bear the sight of them longer than any others. Hence we find the goodness of God has clothed the heavens with blue, and the earth with green; these colours are sufficiently vivid and gay to produce an agreeable impression upon the eye, whilst they are not bright enough to injure and fatigue. They have besides a sufficient variety of shades to distinguish objects, and prevent too great uniformity.

Besides plants of every variety of green, the earth presents us with flowers of the most beautiful tints, which not only rejoice the eye by the pleasing diversity of their colours, but they perfume the air, and regale our smell with the most balmy and odoriferous scents. The ear also has its share of enjoyment; it is gratified with the melodious warbling of the birds, that fill the air with the music of their songs.

With a heart overflowing with joy and gratitude, I venture, O God! to exalt thy name and to celebrate thy goodness. How precious is thy bounty! how loving and merciful thy paternal care and tender regard! None of thy creatures are concealed from thy presence, none of them are despised or disregarded; but all without exception are the objects of thy Providence, and the subjects of thy mercy and love. May thy beneficence and goodness ever be the

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subject of my meditations, and may my soul never cease to bless thy holy name, and to rejoice in the songs of thy praise!

APRIL XX.

BENEFICIAL INFLUENCE OF THE SUN UPON THE CREATION.

At the approach of spring we behold revolutions which should fill every attentive observer with admiration. Nature gradually resumes the life she seemed to have lost during the winter; the earth is overspread with verdure, and the trees open out in bloom. Every where new generations of insects and young broods of animals spring forth, and, endowed with various degrees of instinct, rejoice in their existence. Every thing is animated, every thing revives; and the new life which is manifested in nature, in the vegetable and animal kingdoms, is produced by the return of that warmth which awakens their productions, and puts in motion their recruited powers; the great cause of which is the sun, the source of life, sensation, and joy, whose vivifying rays are diffused through all nature. The grain and seeds feel his influence, and are unfolded in the bosom of the earth; by his power every plant and vegetable springs up and grows. His approach reanimates and strengthens every living creature, and all that live, breathe, feel, or vegetate, experience the influence of this powerful luminary.

What could we do if we were deprived of the light and heat of the sun? How dreary and sad would the earth appear, now become an uninhabitable desert! And how miserable and comfortless would be the few creatures that could then exist! What a source of joy and pure pleasure should we be deprived of, if we were never more to feel the genial rays of the rising sun, nor witness the beauty of a serene sky! Nothing could compensate the want of the sun; the mildest night, the most temperate artificial heat, could not supply that vivifying influence which the light of the sun communicates to every being, and which is entirely different from, and far superior to, any terrestrial fire.

The salutary influence of the sun is well known to men and animals; an invalid shut up in a warm chamber, with every assistance of art, will not gain in many weeks as much strength and vigour as he would in a few days from the mild influence of the sun in fine spring weather. Plants which an artificial heat forces to spring up, never acquire that degree of strength which they do when they are acted upon by the rays of the sun; in this case every thing conspires to their perfection, whilst in those produced by artificial heat we only perceive the weak and languishing efforts of art to supersede nature.

But could the sun exist, and communicate to us his heat and light, unless he had been formed and received his power and ability of diffusing it upon the earth by an infinite God, the Creator of all things? To him alone we must look up as the Author of all the benefits we

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receive from that glorious luminary the sun, which in the plenitude of his power he has created, and in the perfection of his wisdom directs in its course, and supports the brilliancy of its fire and the splendour of its glory. Every morning he causes it to gild the chambers of the east, and to diffuse its enlivening influence over the face of the earth. Without God we should have neither sun, light, heat, nor spring; to him, therefore, my soul wishes to raise itself, and in thought to enjoy the presence of the immortal Being who created the sun; the genial warmth and pure light of which dispose me to reflect upon this Parent of light and glory, this everlasting Fountain of all that is good, amiable, and delightful. The ignorant heathens, blinded by superstition and perverted by prejudice, saw this glorious luminary disperse the shades of night, and illumine the eastern horizon; they witnessed the regions of the west nightly irradiated by his departing beams, and they prostrated themselves in adoration, worshipping as a god what is only an effect of divine power. But those who are favoured to participate in the light of truth know, that without the command of God no sun could exist to illumine and cheer the earth; that without his will no vegetation, life, and fruit, nor any comforts, could be administered to the sons of men; and that the sun is merely the instrument of his goodness, the minister of his will, the herald of his glory.

As the earth, deprived of the light and heat of the sun, would be a lifeless desert; so the heart of man, deprived of the Sun of truth and righteousness, would be destitute of joy and true felicity. To him we owe all the life, virtue, and happiness our souls possess; and without his saving power we should be like lifeless trunks, without leaves or fruit. As all nature languishes for the presence of the sun, and longs for his appearance, so may my soul long to feel the sweet and refreshing influence of Christ, which purifieth and strengtheneth the heart unto salvation, and is productive of every good work.

APRIL XXI.

RELATIONS THAT ALL CREATURES HAVE TO EACH OTHER.

The prodigious number of creatures on the earth merits our attention; and still more so do the relative proportion between these and the relations which so link and connect this vast variety of beings, that they form one regular and perfect whole.

The extent of the animal kingdom is inconceivable, and yet every animal finds a sufficiency of nutriment. No species, however few in number, however persecuted, become extinct; and though many of them are the prey of others, the number of rapacious animals is not considerable; most of them are solitary, and they do not multiply rapidly. Those which are very numerous are satisfied with a moderate portion of food, and procure it without much art or labour. Many

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have enemies to contend with, which prevent them from increasing too much; and some weak and timid animals supply in number what they want in strength, or escape from their adversaries by the artifices of cunning and the dexterity of address. We may also remark, that for the better preservation and multiplication of the species, the proportion between the two sexes is so equal, that every animal finds a mate with which it may consort.

The mineral kingdom is subservient to the preservation of the vegetable, and both of them tend to the advantage of man. The most useful plants, as wheat, &c. are most easily multiplied, are less liable to spoil, and grow wherever there are men and animals. Those animals also which are the most useful are likewise the most abundant; and the productions of several climates are suited to the particular wants of men. Thus the hottest countries abound in cooling and grateful fruits; in countries liable to great drought there are plants and trees which are as springs of water, and relieve the intense thirst of men and animals. If in any place there it a deficiency of wood for fuel, there are coals and turf in abundance; and if there are countries destitute of rain and other sources of fertility, they are recompensed by beneficial inundations, such as of the Nile in Egypt.

Amongst the human species we also find the proportion between the sexes pretty even; the number of males to that of females being as twenty-six to twenty-five. In civil society wealth and talents are so admirably distributed, that as every individual may be happy according to the particular circumstances in which he is placed, so nothing essential is wanting to the good of society in general. If the inclinations and propensities of men were not so varied; if their tastes and dispositions did not lead them to embrace different kinds of life, and to adopt different views; if there was not such a diversity of genius, and such a variety of talent; such a difference of opinion respecting beauty, riches, and every other exterior circumstance; human society would have no charms to interest, no pleasures to invite, but would present one constant assemblage of uniform sterility. No class of men can live isolated from the rest; and each country has its peculiar advantages, which, if common to all, would do away the necessity of the connexion and commerce at present so essential to the interest and convenience of each. In short, wherever we cast our view we see nothing but harmony and beautiful proportion. Notwithstanding the infinite variety of creatures, and the frequent interruption of some of the laws of nature, every thing in this immense universe is beautiful, and arranged with the regular proportion and admirable perfection which produce the greatest possible good to the creation.

Let us then adore and exalt the great Author of nature, and whilst we contemplate the glory and magnificence of his works, sing his praises with the gratitude of an overflowing heart! The greatest proofs, and the most pleasing employment, of reason, is to admire the wisdom of God; and though the most profound investigations can

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penetrate through a very small part of the glory which shrouds the works of Omniscience, and the most that we can know is little in comparison of what is concealed from our view, we yet discover sufficient to convince us that the perfection of God is infinite, and his power and goodness without bounds; and may he graciously condescend more and more to remove the film from our eyes, that we may acknowledge him in all his works, and feel in ourselves a degree of that divine peace and ineffable love with which he governs the universe and arranges the spheres!

APRIL XXII.

OF THE CONSTITUENT PARTS OF WATER.

When we drink water, if we suppose that we are partaking of a pure and simple element, we are deceived; for naturalists affirm that each drop of water is a little world, in which the four elements and the three kingdoms of nature are united. There is scarcely any water that does not contain much heterogeneous matter, which is readily discovered when the water is either distilled or filtered: and however incredible this may appear, it is sufficiently proved by the most exact and accurate experiments.

Besides its elementary parts, water contains different earthy particles; such, for example, as belong to the mineral kingdom; as calcareous earths, nitre, and other salts. This will appear less remarkable if we consider how many earthy particles the water must meet with and dissolve in its course, or carry along with it. Water also contains an inflammable principle, which becomes manifest when in a state of corruption; and it contains a large portion of air, which is manifested during ebullition. It possesses heat, which keeps it in its fluid state; for when deprived of its caloric it is congealed, becomes heavy, and acquires the hardness of stone. Thus common water contains earth, salts, hydrogen or inflammable gas, heat, and air; which proves the truth of the assertion, that all the elements are united in a single drop of water.

But are plants and animals found in it? It certainly contains the principles of vegetation; since all plants derive from water their most nutritive juices, and are indebted to it for their growth and increase. As to the animal kingdom, there is abundant evidence of its existing in water; to say nothing of the fish and other aquatic animals with which it is peopled, there is not a single drop of water which has not inhabitants perceptible through the microscope; and we well know the facility with which insects are propagated in stagnant waters, the germ of which must have previously existed in the water, though certain circumstances might have prevented their development.

The consideration of all these particulars should lead us to reflect upon the wise providence of the Creator, who has not by chance

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formed the waters of so many parts. Were it purely simple, it might perhaps make the most pure beverage; but its medicinal virtues would be lost. From the great nutriment which it affords to plants, we may naturally suppose that it yields some of the nutritious properties it contains to men and animals; and though in itself it may not be very nutritious, it tends to the more perfect solution of our aliment, and to distribute it more readily through the minuter vessels. It is found to be the most wholesome beverage, and one which we cannot do without; the salutary effects of which are often felt when every other drink is prejudicial.

How grateful then ought we to be to God, whose goodness has so amply provided for our necessities! He has prepared for us that kind of food and drink which is fittest for our nature, and the most beneficial to our comfort and health; and he has imparted a salutary virtue to the most ordinary and indispensable means of subsistence. Let us therefore praise God for the water which he has given to allay our thirst, and digest our food; and though we should have nothing but bread and water for our sustenance, let us endeavour to be contented and grateful. Let us implore the blessing of God on what we eat, and ask grace to use it with a cheerful and contented mind.

APRIL XXIII.

PROPAGATION OF PLANTS.

Vegetables are in general propagated from seed, and in most plants the flowers produce the seeds which are to continue and preserve their fertility. Almost all flowers are folded within a bud, where they are secretly formed, being defended by their tunics and external leaves. When the sap begins to flow abundantly at the beginning of spring, the blossom swells, the bud expands, the tunics open and fall off, leaving the flower in naked beauty. We perceive on the outside some very small leaves of different colours, which serve to defend the organs of fructification, and probably to prepare the nutritious juice which enters those parts. It is, however, in the centre of the flower that we discover the organs of fructification. We find there a filament or stem, called the pistil, which, particularly in tulips, rises pretty high. Round the pistil are the stamina, capped with tops which contain a prolific dust, tinged of various hues. These stamina may be considered as the proper male organs, destined to impregnate the germs, and the pistil the female part which receives the fertilizing dust.

Vegetables are also propagated by grafts. From the tender branch of a tree, when in sap, they detach an eye or beginning of a branch, with a part of the bark, and insert it between the bark and wood of another tree, and bind up the whole very gently, by passing flax or some soft cord several times round it. From this there proceeds a branch of the same nature with the tree from which the eye was first

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taken, although the tree in which it is inserted be of a quite different sort.

Trees and other woody plants are propagated by slips: thus, for instance, a slip is taken from a willow, which, after being stripped of its small sprigs, is deposited in the ground; roots soon proceed from those places where branches had begun to appear, and in time it becomes a tree.

Another way of propagating vegetables is by means of roots; but these should have eyes, or they will not grow. Some plants shoot forth long filaments in all directions, which have knots or eyes; these extend their fibres in the ground, which become so many new feet that may be separated from each other, and then form new plants. A bulbous root is a species of eye in which the rudiments of the future plant are enclosed, and between its leaves are little bulbs or eyes, which enable the plant to be propagated by the leaves to which these bulbs are attached.

What a variety of causes are requisite for the production, preservation, and propagation of vegetables! Granting that the germs already existed, what art is required to effect their development, to give growth to the plant, to preserve it when arrived at maturity, and to perpetuate its species! How fruitful a mother must the earth be, in whose bosom so many tender plants are cherished and derive their nutriment! Water, which also contributes to their support, must be composed of all those particles, the assemblage of which favours the germination of plants. The sun must put all these in motion, and cause the seeds to germinate and the fruits to be matured, by the vivifying influence of his heat.

It was necessary to establish a proper balance and a just proportion between plants, that on the one hand they might not multiply too fast, and on the other that there might always be a sufficient abundance. It was requisite that the texture, vessels, fibres, and every part of the plant, should be so disposed that the sap might penetrate them, circulate, and be so prepared and digested, that the plant might receive its proper form, size, and strength. It was necessary to determine exactly what plants should spring up of themselves, and what others should require the care and cultivation of man. The work of the generation and propagation of plants is then so complicated and intricate, and passes through so many different processes, that it would be impossible to develop the great chain of causes and effects which produce such wonderful changes. However, we know sufficient to acknowledge the wisdom and beneficence of the Creator; for who else could have communicated to the elements the power of perpetuating vegetables? or have given to the sun that light and heat, the blessed effects of which upon the earth are so abundantly conspicuous? It is God alone who has created the constituent parts of plants, and who has dispersed them in the air, in the waters, and upon the earth; who has established the laws of motion, formed the atmosphere, and produced the sources of rain and clouds. It is God who giveth life to seeds, and existence and increase to vegetables; by

his order the earth yearly renews her fruits, and each spring restores the youth of nature, and each summer perfects her beauty. Let us then for ever celebrate the power, the wisdom, and goodness of the great Creator of plants as well as of men! Let earth and heaven proclaim how great and glorious is his holy name, now and through all eternity.

APRIL XXIV.

DIVERSITY OF TRAITS IN THE HUMAN COUNTENANCE.

It is an evident proof of the adorable wisdom of God, that though the bodies of men are so similar to each other in their essential parts, there is yet such a diversity in their exterior, that they can be readily distinguished without the liability of error. Amongst the many millions of men existing in the universe, there are no two that are perfectly similar to each other: each one has some peculiarity portrayed in his countenance, or remarkable in his speech; and this diversity of countenance is the more singular, because the parts which compose it are very few, and in each person they are disposed according to the same plan. If all things had been produced by blind chance, the countenances of men might have resembled one another as nearly as balls cast in the same mould, or drops of water out of the same bucket: but as that is not the case, we must admire the infinite wisdom of the Creator, which, in thus diversifying the traits of the human countenance, has manifestly had in view the happiness of men; for if they resembled each other perfectly, they could not be distinguished from one another, to the utter confusion and detriment of society. We should never be certain of life, nor of the peaceable possession of our property; thieves and robbers would run little risk of detection, for they could neither be distinguished by the traits of the countenance nor the sound of their voice. Adultery, and every crime that stains humanity, might be practised with impunity, since the guilty would rarely be discovered; and we should be continually exposed to the machinations of the villain and the malignity of the coward: we could not shelter ourselves from the confusion of mistake, nor from the treachery and fraud of the deceitful; all the efforts of justice would be useless, and commerce would be the prey of error and uncertainty: in short, the uniformity and perfect similarity of faces would deprive society of its most endearing charms, and destroy the pleasure and sweet gratification of individual friendship. The variety of features, then, constitutes part of the plan of divine government, and is a strong proof of God's tender care over us; for it is very evident that he has disposed the particular parts of the body with as much wisdom as he has manifested in its general structure, and we are compelled to admire his beautiful and wise arrangement in this as well as in every other part of the creation.

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APRIL XXV.

THE UNIVERSAL CARE OF GOD OVER HIS CREATURES.

All the creatures which live in the air, in the waters, and upon the earth, enjoy the care of Providence; by which they are maintained in their particular states, and live, thrive, and propagate their species; each according to the faculties it has received, and in its own particular nature, fulfilling the end for which it had existence upon the earth. Animals destitute of reason are provided with organs, strength, and sagacity, adapted to their several destinations. Their instinct teaches them what is dangerous or hurtful, and enables them to seek, discern, and prepare, the aliment and the habitation destined for them. All this is involuntary, it is not the result of choice and reflection; they are irresistibly impelled to it by propensities which a Superior Power has given them for the preservation and support of their lives. They find suitable food and convenient habitations, and no species of animals is destitute of what is necessary to its subsistence and well-being.

Man is of a superior nature, but he comes into the world in a state of greater feebleness, and has much more need of assistance than most other animals. His faculties, necessities, and desires, are greater and more numerous, as well as more urgent, and require more care and attention: hence we find he is more favoured with the regard, and more cherished by the blessings of divine Providence. The earth, the air, and the water, the clouds, and the reflected light of the luminous spheres revolving in space, contribute in an abundant and diversified manner to the preservation and happiness of man. God has distributed his blessings to all intelligent beings with an impartial love, and he has subjected to their dominion creatures destitute of reason, whose lives and strength are employed in their service.

What again particularly merits our attention is, that all the habitable parts of the earth afford a sufficient degree of nutriment to the creatures which live there. Thus, not only the fertile bosom of the earth, but the vast plains of air, and the depths of the sea, teem with alimentary matter suitable for the support of the innumerable multitudes that exist in these elements. The treasures of divine bounty are infinite; and the provision that God has prepared for all his creatures answer every want, supply every necessity, and can never be exhausted. The world does not decay, and the sun daily shines with his wonted light and accustomed heat. The fertility of the earth does not diminish; the seasons regularly succeed each other; and the fields never fail to offer their annual tribute of fruit for the support of the animal world.

Whether we consider the constancy, the riches, or the diversity of the means of subsistence which nature affords in all situations, we always perceive the traces of an all-bountiful Providence. All things which surround us, and which serve to support us and procure the

comforts and pleasures of life, are so many visible means, so many open channels, by which our Preserver and glorious Benefactor distributes his favours and diffuses his blessings. The agents of nature are the ministers which fulfil the designs of Providence; the world is as his magazine, from which we draw all that we need; and it is only to his parental care, and that ineffable goodness, the essence of divine nature, that we owe all these benefits.

Father of the creation! in whom we have life, motion, and being, how extensive and inexpressible is thy compassion, and how mercifully thou rulest all things by the word of thy wisdom! At thy command the dews of heaven descend to refresh the thorn as well as the cedar, and the lot of mortals is in thy hands, and in thee their felicity: thou art their supreme good, and thy fatherly cares are extended over all the children of humanity! Thy merciful goodness causeth the sun to shine alike on all thy creation; and at thy command the gentle breezes waft the perfuming balm of the rose, and the air smells sweet with ever-freshening odours; the most delicious fruits rejoice our taste, and the soft showers fall to revive drooping nature! Thy gifts are proportioned to the necessities of thy creatures, and thou causest the righteous to partake of the sweet and saving influence of thy grace! Thou givest to the bee the nectar of the flowers, to the worm the drop that quenches his thirst, and to the world the rays of the sun!

APRIL XXVI.

FLOWERS WHICH BLOOM IN APRIL.

The nearer that charming month approaches, when we shall see the country, gardens, and meadows, arrayed in all their beauty, the more does the dreary aspect we have so long witnessed clear up, and nature more evidently throws off her wild appearance. Every day discloses some new beauty, and every hour hastens the perfection of nature. The fresh grass already sprung up is browsed by the flocks with avidity; the young corn begins to appear, and the gardens to smile. Here and there the budding flowers invite our attention; and the sweetly-modest violet is one of the earliest that scents the air of spring. The flowerets of the beauteous hyacinth, gradually rising above the leaves, at once please the eye and gratify the smell, by the richness of their tints and the fragrance of their perfume.

The imperial crown throws out a number of stellated leaves; its stem rises high, and its red and yellow bell-shaped flowers inclining towards the earth, form a sort of crown surmounted by a tuft of leaves. From the midst of its leaves the auricula raises its stem, supporting a bunch of flowers, the circular edge of which exceeds the richness of velvet and the softness of satin. The tulip opens out more slowly, scarcely yet daring to unfold its beauty, lest the night

air or chilling blasts should suddenly nip its opening charms and destroy its infant splendour. The ranunculus, the pink, and the rose, hide their beauties till milder weather permits them to bloom in safety.

An attentive observer will find in these delightful objects great cause to admire the wisdom and goodness of God; it is with the wisest views that, at the return of spring, each plant begins precisely in the time and in the order prescribed to it to develop its leaves, put forth its buds, and prepare for the production of fruit.

In the vegetable kingdom one species succeeds to another from the commencement to the termination of the year; scarcely are some visible when others are ready to appear, and these are followed by others, which spring up each in its turn and allotted time. Whilst one plant brings its fruit to maturity, nature excites another to propagate, that its fruits may be ready when the other has accomplished its end. Thus we constantly receive a succession of flowers and fruits; there is never any want, and from one end of the year to the other Nature watches over and preserves her productions.

The flowers of spring, which we contemplate with so much delight, should induce us to reflect upon youth, the flower and spring of life. Like them, youth grow up amiable and beautiful, with a thousand charms and opening virtues that cause them to be admired and loved; but as the north wind sometimes sweeps over the fairest flowers of spring, blasting in its course the rich hyacinth and the lovely violet, so the pride of beauty and the glory of youth are often nipped in the bud, and fade ere their opening charms are perfected. Beset with dangers and surrounded by misfortune, the horizon of youth often lowers, and obscurity renders dreary their morn of life; or if brighter prospects gladden their path, they are suddenly wrapped in night, and involved in gloom. Let no one, then, in the vanity of his heart, boast, because he abounds in the pleasures of youth, or exult in his superior endowments: for the days of man are as grass; as a flower of the field he flourisheth; the wind passeth over it, and it is gone, and the place thereof shall know it no more.'*

APRIL XXVII.

RETURN OF THE BIRDS.

Numerous species of birds at the beginning of winter emigrate to other countries; some in search of a milder climate and others to find secure retreats and warm shelter in caves, holes, and retired places. These birds return to us when the gentle mildness of the spring advances; it soon awakens the swallows, and a secret instinct brings back the others which had traversed the seas to far-distant countries,

* Psal. ciii. 16.

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in search of that subsistence and temperature which their nature required.

Their return is generally in such an order, that those which went away the latest are the first which come back. The air will soon become repeopled with its feathered songsters; the nightingale will again rejoice the groves with its melody, the twittering swallow resume her former nest, and the stork again inhabit the retreat she left at the beginning of winter. In a few weeks the skies will once more be gladdened with the joyful songs of the returning choristers, and the valleys will resound with their swelling notes.

Two circumstances in the emigration of birds particularly claim our attention; they know exactly the time when to return, and the direction they are to take. 'The stork in heavens knoweth her appointed time; and the turtle and the crane, and the swallow, observe the time of their coming.'* No doubt the temperature of the air, and the natural propensity of creatures to produce and rear up their young, are powerful motives to influence them to a change of abode. But besides these, there is a very singular and in some respects inapplicable, instinct, which prompts them to it. How astonishing, that these timid animals deprived of reason, should know exactly the direction they are to take, and how far to go! Without compass to steer, and guide to direct, without provisions, they undertake and finish, in the most regular order, a voyage which is sometimes many hundred miles in extent!

Who marks out to them their tract through the devious air? Who informs them of the length of the way they have passed, and of that they have yet to accomplish? And who is it that guides their flight and supplies them with every necessary during the voyage? Whichever way we consider these facts, we must discover and acknowledge the manifestation of a power superior to mere animal instinct; we must confess the influence of God, and own the effects of his Almighty power. It is to him the birds are indebted for that instinct which they blindly obey; he pointeth out to them the country, and the very trees and shelter, where they may dwell in security; he conducteth their distant migrations, and listeneth to their cries when they call for nourishment; and he who hearkeneth unto the feeble birds will never forsake his children, nor suffer the deserving to perish.

APRIL XXVIII.

THE UTILITY OF FORESTS.

During the winter, which is just past, many people have experienced the great advantage of forests; which have furnished us with fuel at a time when the intensity of the cold was severely felt. But

* Jer. viii. 17.

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this is far from being their only, or even their principal, use; else why do those immense forests exist, to form an uninterrupted chain through whole provinces and kingdoms?

May not one end of their creation be the pleasure we derive from their appearance? they form one of the greatest beauties of nature, and it is always regarded as an imperfection in a country to be destitute of woods and thickets. Our impatience when the leaves in spring are backward in appearing, and the delight we experience when at length they open out, proves how much they adorn and embellish nature. Whilst reflecting upon the utility of woods, we should not forget the fruits which the numerous species of trees produce; for though there are some trees whose fruits do not appear to be of any use to man, the trees which bear them are always useful, whether for their beauty only, or the advantages of their foliage and wood.

And if we properly reflect, we shall acknowledge that those trees which are called barren are nevertheless of great use; they nourish and support a variety of insects, which serve as food for those birds which afford us sustenance and the most exquisite dainties. The acorns of the several species of oaks, chestnuts, and various other productions of trees, are the favourite aliment of swine and wild boars: and have we not sometimes known these fruits become the food of man? And they are farther useful in being the seed which perpetuates the forests. How many animals find a shelter and an existence in the woods, which without them must perish! and of how many conveniences, utensils, and medicines, should we not be deprived, if we had no wood, bark, or roots! and how dull and sterile would the earth appear, if no trees waved their verdant heads above its surface, and if no groves diversified its plains! Forests then being of the most essential use to mankind, Nature herself has the care of perpetuating them. If their preservation and increase had been abandoned to the casual vigilance and industry of men, they would long since have perished. But the Creator himself has preserved the trees of the forest; he alone has planted and supported them. He disperses the small seeds over the country, and gives them wings, that they may be more easily wafted by the wings to the distant places destined to receive them. He alone has caused those large trunks to rise up majestically in the air, and meet the clouds with their spreading foliage; it is he who has established them firmly in the earth, where their branching roots enable them to defy the winds and brave the storm; and he waters them with his dew, and refreshes them with his rain; their beautiful verdure yearly returns, and they seem to preserve a perpetual life.

Merciful Father! thy goodness extends over all the earth; every where the traces of thy beneficence and the effects of thy wisdom appear; in the fields and in the groves, in the wild desert and in the flowery mead, thou hast erected monuments of thy goodness, and placed memorials of thy bounty; and the season is now approaching when I can sit beneath the shade of the spreading oaks, and, whilst my heart swells with love and gratitude, pour forth the feelings of my

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soul in songs of joy and hymns of adoration in praise of thee, and in celebration of thy holy name.

APRIL XXIX.

PLEASURES DERIVED FROM THE CONTEMPLATION OF NATURE.

Nature, with maternal kindness, offers to all her children the most delightful and universal, as well as the least expensive, of all pleasures. Such our first parents enjoyed in Paradise, and it is only depravity which leads men to delight in other recreations. Mankind are accustomed to despise the blessings which they daily enjoy, and seek for amusements that afford them pleasure from their variety, and a succession of delight from their novelty: while the pleasures of nature exceed all others, are open to every one, and their enjoyment never leaves behind it the sting of remorse, or the tears of repentance. But we are so selfish as to disregard the charms of nature, because they are alike open to the eyes of the poor as to those of the rich; and so foolish as to despise them, because of their cheapness; whereas nothing should gratify us more than to know, the same objects which cause our delight constitute the happiness of millions. Compared with the noble and affecting pleasure such a consideration excites, how frivolous and deceitful are all those costly amusements, which delight the rich and please the foolish! their enjoyment often ends with disgust, and leaves as its portion a painful vacancy of soul; whilst nature, ever rich and bountiful, continually varies her charms, and offers new beauties to the admiring observer.

All the pleasures which are the effects of art are of short duration, and fleeting as the dream, the illusions of which vanish when we awake. But the exercise of reason, and the ever-varying pleasures of the imagination, last for ever, and derive new strength from contemplating the works of nature, which calls forth all the finer feelings of the heart. To see the starry heavens, the earth variegated with flowers, a thousand different landscapes, and prospects vying with each other in beauty; and to listen to the evening song of the nightingale wafted on the breeze, whilst all nature is retiring to repose; will ever fill our souls with delight, and gratify all our feelings. If any one is insensible to these beauties, and unaffected by their charms, it must be owing to his depravity, or the stupidity which he has acquired from inattention. The great science of Christianity consists in the innocent enjoyment of every good which surrounds us; and he who practises this, possesses the art of deriving the means of happiness from every circumstance that does not injure his virtue, his intellect, or his feelings. Beneficent Creator! thou art mindful of us in this beautiful season, and providest us with abundant sources of pleasure! Thou continually causest new springs of delight to open, and our hearts are filled with joy and gladness! If we desire

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to elevate our hearts to thee, to indulge in holy meditation, and to enjoy celestial bliss, nature often offers us the most ample means. May we ever prefer this exalted satisfaction before all the pleasures of sense! In these sweet days of spring, may the enjoyment of nature's purer pleasures be more grateful to us than the allurements of sensual gratifications, which neither dignify the mind nor purify the heart! Teach us, O Lord, to acknowledge thy divine power and goodness; for it is by seeking to know thee in the varied and numerous works of thy creation, that we open to ourselves a pure and inexhaustible source of delight, and are enabled to enjoy, in this state of existence, a foretaste of the felicity which the righteous shall experience in thy presence for ever and ever!

APRIL XXX.

THE GLORY OF GOD SEEN IN THE CREATION OF ANIMALS.

Animals, instead of being abused, should be treated with all possible kindness; and, to enable us to do this better, we should consider them as subjects in which we may glorify God. All creatures may serve this purpose, but none so well as the animal creation. Every plant, tree, flower, and stone, bears the impression of the grandeur and glory of the Creator; but in the animal kingdom it is still more manifest. Examine the structure of any single living creature, and what art, beauty, and wonderful mechanism, do we discover! and how these are multiplied, when we consider the prodigious number and immense variety of animals, forming one uninterrupted chain from the elephant to the little mite seen through a microscope! What links, order, and relations, exist amongst all creatures! All is harmony; and if upon a superficial view we suppose we have discovered any imperfection, we shall soon find it was our ignorance led us to such an enormous conclusion.

It is not necessary that each individual should make deep researches into the nature of animals, or that every one should become a profound naturalist; it is merely sufficient to pay attention to what is well known and most common, to what may come under the observation of all. We see, for instance, a variety of animals formed in an admirable manner, which live, feel, and move, as we do; which, like us, are subject to hunger, thirst, and cold; and which consequently stand in daily need of having their necessities supplied. To all these creatures God has given life; he preserves them, and provides for their wants; he watches over them as the father of a family over his household. From this we may conclude, that God has the goodness and tenderness of a father; and if his cares thus extend to animals, what will he not do for man? If it be his chief desire to render the lives of creatures devoid of reason comfortable and happy, what may we not expect from his beneficence? Let the imbecile and

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distrustful man blush for his doubts and anxieties, who, when abundance is no longer his portion, despondingly anticipates the dread of poverty, and fears that his Creator will suffer him to perish for want. We may rest assured that he who supplies the necessities of every animal will administer to us the necessaries of life.

The instinct of animals gives us fresh cause to admire the Supreme Being, who has so wisely combined the means with the end. As the instinct of animals tends particularly to their preservation, it is most observable in the love and tender solicitude they feel for their young; and as the strongest instance of parental care, our Saviour makes use of the image of a hen gathering her young under her wings. It is certainly a very pleasing sight to see the strong affection which a hen bears to her young ones, and the continual care she takes of them; she never ceases to watch over them, flies to their assistance at the least appearance of danger, boldly opposes every aggressor, and hazards her own life to save her young. She calls them, and reanimates them with her maternal voice; extends her wings to receive and cover them; and neglects every convenience for herself, whilst she thinks of nothing but the safety and well-being of the objects of her affection. Every one must acknowledge in this the effects of infinite wisdom; for without this maternal solicitude, this instinct, so powerful and so superior to every thing, the chickens must perish, and the species soon become extinct. It cannot be said that the hen acts thus for her young with any understanding or reflection; or that she judges, reasons, foresees, combines, and draws inferences. She does it from the operation of that instinct which she has received from the liberal hand of nature, without study and without application. It is then the duty of man to seek in animals an occasion to glorify God; and as our attention increases and our observations become more extensive, our knowledge will be improved, and the pleasure we receive from these investigations will be more frequent and exquisite.

MAY I.

HYMN ON THE BEAUTIES OF SPRING.

Blessed children of God! open your hearts to joy! See the Spring walking forth in beauty and gayety. Contemplate the verdure of the fields and the flowers of the meadows, whose fruits will soon bring us the sweets of abundance. Yonder tree, which not long since appeared devoid of life and vigour, is now decked with blossoms that promise an abundant harvest.

How beautiful is nature! How graceful her ornaments! Every animal, mead, wood, and field, revives, and, together with man, rejoices in a new existence. The lark soars aloft, till her sweet carols faintly die away on the breeze; the pigeons, in many a giddy whirl,

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fly round the flowery plain; and the plaintive melody of the nightingale pours from the groves, and amongst the flowers, the soft notes that are heard in the vales, or, louder swelling, fill the hills and woods. Here the fruitful hen guides, protects, and shelters with her wing, the feeble, unfledged little ones, which nature has entrusted to her care. The swallow, leaving her nest, immediately returns to the calls of tenderness, and brings her young the desired nourishment. The corn springs up in luxuriance, and promises abundantly to reward the toils of the labourer, who joyfully anticipates his future blessings. Men plant, but the vivifying rays and fertilizing showers descend from heaven. The heat of the sun ripens the fruits of the earth, and causes the life-invigorating juice to flow from the vine. The most humble and abject of the sons of men, when animated with celestial radiance, and favoured to drink of the living waters from on high, becomes the honour of humanity, and the messenger of the power and glory of God.

MAY I.

SYSTEM OF THE WORLD.

Of all the parts which form the mundane system, the sun is the most striking and interesting. His form is spherical, and from him continually emanates an inexhaustible stream of luminous particles. By the telescope we discover in him certain spots by which we can ascertain that he turns round his axis. His distance from the earth is eighty-two millions of miles, and he is one million of times larger. He communicates his light to at least twenty opaque globes that revolve round him at different distances. The nearest to him is the planet Mercury, which is seldom seen, and little known. Next is Venus, called both a morning and an evening star; because she sometimes precedes the sun, and sometimes follows after him. After Venus comes our own planet, the external surface of which is composed of earth and water, of mountains and valleys, and its internal parts of beds and strata of different substances. This earth is the abode of a multitude of creatures, animate and inanimate; plants, metals, and animals. The moon revolves round the earth, and accompanies it in its revolution round the sun. She is fifty times less than the earth, and on her surface we discover several brilliant spots, as well as some which are opaque. If the surface of the moon was entirely level, the rays of light would be equally reflected from every part, and we could not then observe these spots, of which the brighter were formerly supposed to be continents, whilst those of a darker and more opaque appearance were considered as seas, appearing dark from their absorbing the rays of light: but later observations have proved, that they are only vast cavities which do not reflect the sun's light so

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strongly; that the luminous parts are plain superficies, and those that are most brilliant are lofty mountains.

The remaining planets in our system are, Mars; Jupiter, and his four moons; Saturn, and his seven; and Herschel or Georgium Sidus, and his six moons. Saturn is at such an immense distance from the sun that he is nearly thirty years in performing his revolution. The vast dominion of the sun, above a thousand millions of miles, is but a part of the universe; for each of the fixed stars is a sun, equal in magnitude and brilliancy to that which enlightens our sphere. Such is the grandeur of God, and such his glory, displayed in these admirable works; which invite us to pay our tribute of admiration, reverence, and praise, to the Being which formed them! Is there any thing in nature more proper to inspire in us exalted ideas of the Deity than the aspect of the heavens, nightly irradiated with thousands of revolving spheres! May we never view them without feeling the most lively sense of the munificence and grandeur of him who has created all things, and continues to preserve them with wisdom and rule them with merciful goodness.

MAY II.

BLOSSOMS OF TREES.

Our gardens and fields are now decorated with the beauties of spring, and every part of Europe presents the most delightful aspect. The eternal word of the Creator, pronounced when he formed the world, has produced all these effects; his all-creating hand has again renovated the earth, and in a measure created it anew for the pleasure and happiness of his creatures. It is God alone who calls for the spring and orders it to appear. Approach, O man, and try what thy wisdom and thy power can execute! Canst thou make one tree to blossom, or one leaf to germinate? Canst thou call from the earth the smallest blade of grass, or order the tulip to rise in all its splendour? Contemplate these flowers; examine them with attention. Can they be more perfect, can their colours be more beautifully blended, or their forms more elegantly proportioned? Can the pencil of the painter equal the warmth of the blossoming peach, or imitate the richness of a cherry-tree in bloom? So far from imitating, no one can conceive all the beauties of renovated nature: and if there were no other proofs of the power and wisdom of God on the earth, the flowers of spring would sufficiently display them. Every tree that blossoms, every plant, every flower, manifests a portion of that wisdom and beneficence so abundantly diffused through the earth. There is an infinite diversity among the blossoms of trees; though all beautiful, they differ in degree, one surpassing another; but there are none which do not possess some beauty peculiar to themselves. Some have flowers of a pure white; others have streaks of red and shades,

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and add to beauty and elegance the most exquisite fragrance. But all these multiplied varieties do not affect their fecundity.

From the consideration of these circumstances, we may receive profit and instruction. We may reflect, that, though we are not favoured with the same advantages that some possess, we should neither be discouraged nor afflicted. The privation of some accidental benefits can in no degree injure our well-being. Though we may not be quite so rich, so powerful, or so handsome, as some are, these are trifling things in the estimation of the virtuous and the wise; for without them we can be equally happy, equally useful to our fellow-creatures, and equally pleasing to God. True beauty consists in the works of piety, and the fruits of virtue. The blossoms of a fruit-bearing tree please more than the splendour of the tulip, or the richness of the auricula; because from the one we expect, when the blossoms are over, to receive fruit; while the others please for a moment, and are seen no more. Let us not then prefer the mere lustre and charms of external beauty: the rosy tints of health, the elegance of form, and the freshness of youth, are fleeting, and soon fade; they alone cannot secure present peace, nor durable happiness. Those blossoms only which promise fruit worthy of God, and useful to mankind, deserve our regard, and merit our approbation. As the beauties of the blossoming trees hastily perish, so will the youth, now in the spring of life, flattering in the gayety of their charms. Let us, then, whilst in the morn of life, and in the vigour of health, prepare, by study and application, to produce in the evening of our days, when divested of all external charms, abundant fruits of piety, of virtue, and of knowledge.

MAY III.

OF THE CONTINUAL REVOLUTIONS AND CHANGES THAT TAKE PLACE IN NATURE.

Motion and change seem necessary to the preservation of the corporeal world. If we pay the least attention to what passes on the globe which we inhabit, we shall be convinced that the smallest particle of matter in the universe cannot be considered as in a state of absolute and continued rest.

The earth turns round its axis once in twenty-four hours, and by this motion all the points of its surface change their situation with more or less rapidity. Under the line or equator, where this motion is performed with greater celerity, each body is carried more than one thousand miles every hour, besides the annual revolution of the earth round the sun, which is at the astonishing rate of fifty-eight thousand miles every hour. This motion is not perceptible, but the relative motion of earthly bodies is more observable. Small streams uniting form greater, till at length torrents and rivers are formed, which again

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are lost in the sea. Water is also raised in exhalations, and forms clouds, which produce the rain, snow, and fogs; from these, streams are formed, which once more enter the sea; and tides, storms, and torrents, keep the water in perpetual motion. The atmosphere is not less in a state of rest. Between the tropics an east wind continually blows; and in other places, where no agitation is perceptible, the thermometer and barometer prove that the air is never perfectly calm: and the frequency of meteors sufficiently evinces the continuance of its motion.

The surface of the earth is also subject to frequent revolutions: the hardest rocks cleave, and stones gradually wear away, or break into small particles; some lands sink down, others are inundated, and some are removed by earthquakes. Hills are swept away, and valleys are filled up; marshes are drained and become covered with trees; the depths of the sea are made to wave with corn: and that which was land is now water. Light succeeds to darkness, cold to heat, and wet to drought; and bodies are continually experiencing alterations, many of which are imperceptible. To these we may add the changes to which animal life is subject; and we shall then be able to form some idea of the continual revolutions of nature. Man himself is continually losing a portion of his substance by the process of perspiration, and in a few years is clothed with an entirely new body. Thus every thing upon the earth is in motion, every thing alternately grows and perishes; and to be born and to die, is the lot of all created beings. These continual revolutions are salutary warnings, and teach us that this present world is not the abode for which we are destined. When I consider the perpetual changes and constant vicissitudes incident to all terrestrial objects, I feel the vanity and insignificance of earthly things; and from the frailty and shortness of this life anticipate a better and more perfect state in a future world. Every thing cries aloud that we are only as travellers upon the earth, who have a certain time to sojourn, and then accomplish the end and receive the reward of our pilgrimage. And in the midst of these changes and revolutions the pure and devout soul receives consolation and support from the contemplation of an almighty and eternal Being, who, though the mountains shake, and the hills leave their places, the seas be agitated and tossed by the fierce storm, and all earthly bodies return to original dust, still exists the same, regarding his children with compassionating love, and assisting the helpless in the hour of necessity, and in the day of tribulation.

MAY IV.

AN INVITATION TO SEEK GOD IN THE WORKS OF NATURE.

Awaken, O my soul, from the slumbers which have so long benumbed thy faculties, and attentively regard the surrounding objects.

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Reflect upon thy own nature, and upon that of other creatures; consider their origin, structure, form, and utility, with every additional circumstance that can fill thee with love and adoration of the all-wise Creator. When thou seest the variegated and brilliant colours of the heavens, the lustre of the numerous stars that irradiate them, and the light reflected from a thousand beauteous objects, ask thyself whence all these proceed? Who has formed the immense vault of heaven? Who has placed in the firmament those exhaustless fires, those constellations whose rays shoot through such an inconceivable space? And who directs their course with the beauty of order, and the harmony of regularity, and commands the sun to enlighten and make fruitful the earth? Thou wilt answer, the everlasting God, at whose word the creation arose fair and beautiful, whose wisdom still directs it, and whose mercy still operates for the felicity of all mankind. His hand has established the foundations of the mountains, and raised their summits above the clouds; He has clothed them with trees, and beautified them with flowers and verdure; and He has drawn from their bosoms the rivers and streams which irrigate the earth. To the flowers of the field He has given their beauty, and fragrance, far exceeding all the combinations of art and efforts of skill. All the creatures that are seen in the air, in the waters, and on the earth, owe to Him their existence, and the possession of that instinct which is their preservation; and man, in himself a world of wonders, looks up to God as his Creator and Protector.

Let our chief care and most pleasing duty be henceforth to seek for the knowledge of God in the contemplation of his works. There is nothing in the heavens or upon the earth which does not impress upon our minds the wonderful wisdom and admirable beneficence of the Creator, to whom, in the midst of the revolutions of nature, let us raise our thoughts, and pour forth the joyful accents of our love and gratitude.

MAY V.

MORNING.

When Aurora first peeps, and dissipates the shades of night, we seem to enjoy a new creation. The faint streaks that mark the eastern horizon soon become more vivid, and the morning breaks with beauty; we begin to distinguish the verdure of the hills, the opening flowers, and the pure streams that water the meads. The horizon becomes more luminous, the clouds assume the most beautiful tints, and the charms of the distant valleys open upon us; the breath of the hawthorn is sweet, the dew-drops upon the flowers show the pure lustre of pearls, and nature rejoices in her existence. The first sunbeam darts from behind the mountains that skirt the horizon, and plays upon the earth; more succeed, and the brilliancy increases, till

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the disk of the luminary encircled in glory is visible, and the sun shines in full refulgence; he gains the mid-heaven and no eye can sustain his glory.

When I stand upon the summit of some lofty cliff, and see the star of day slowly rise out of the ocean that foams beneath, I feel a mingled sensation of sublimity, awe, and adoration; I think of the infinite God, the Creator of the sun, and in the beauties of the rising day acknowledge his power and wisdom. With the lark, that carolling in the air, meets the morning, and by the sweetness of his strains proclaims the arrival of day, I soar in thought into the regions of glory, and hail the great source of light. The joy and gayety of all nature, and the raptures of the creation, raise in my breast the strongest emotions of gratitude, whilst my heart swells with delight, and every sense is ecstacy. Yet there are many thousands of human beings who have never known the pleasure of such sensations, nor even experienced the gratification of viewing the morning sun; who prefer the drowsy influence of their bed, and the confined limits of their gloomy chamber, to the freshness of morning and the brilliancy of day.

MAY VI.

VISION.

To enable us to perceive external objects, it is requisite that rays of light be reflected from them. These rays are transmitted to the eye, passing through the transparent cornea, by whose convexity they are united into a focus, through the aqueous humour and pupil of the eye, into the crystalline lens, which condenses them more; and after this concentration, they penetrate the vitreous humour, and impress on the retina the images of external objects; and the optic nerves, of which the retina is an expansion, convey these impressions to the mind, which forms perceptions and ideas according to the different sensations excited by the object presented.

The faculty of vision is one of the most wonderful properties of human nature, and particularly merits our attention. Though the image of external objects is painted upon the retina in an inverted position, we yet see them in their proper situation. And what is still more admirable with such a small organ as the eye, we perceive the largest objects, and take in the whole of their dimensions. From the height of a tower we see at a distance the numerous buildings of a large city painted upon our retina with the utmost exactness and precision, notwithstanding the extreme minuteness of the organ which receives so many millions of rays without confusion. From the top-mast we see the ocean covered with a vast fleet, and waves innumerable undulating around us; from each of which rays of light must penetrate the eye, whose volume is so minute. Or, having gained

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the summit of some lofty mountain, if we direct our view over the distant plains, every object that we notice reflects a number of rays upon our organs of vision, or we could not distinguish the purling brooks, nor the flowery meads. Rays of light not only pass from these objects to our eyes, they are transmitted to every part of the surrounding atmosphere; hence, wherever we pass within a certain distance, the same objects are still visible, the rays constantly proceeding from them, whether they meet the focus of our eye or not.

So far we are able to explain the wonders of vision, but beyond this all is darkness: it has pleased the Almighty Creator to conceal from our limited understanding the immediate connexion between matter and mind; we know the image of external objects is reflected on the retina, and that the mind takes cognizance of it, and here we must rest satisfied; for to explain the manner in which we see these objects is impossible.

MAY VII.

SPRING RENEWS THE FACE OF THE EARTH.

How great a change has taken place throughout nature! The earth, which has reposed during the winter, resumes its fertility, and all the creation rejoices. A few weeks since, every thing was desolate, and wore the aspect of sterility; the vallies now so beautiful were buried in snow, and the mountains, whose blue summits pierce the clouds, were shrouded in thick mist. In those verdant avenues where now dwells the nightingale, were only seen withered branches and leafless trunks. The rivers and streams which now flow murmuring along their channels, were arrested in their course, and rendered motionless by ice. The little choristers, whose loud notes swell upon the breeze, were torpid in their retreats, or had retired to other climes. A mournful silence reigned in the fields, the groves were still, and far as the eye could reach solitude met the aching view. But when the first zephyrs of spring played upon the earth, nature felt their refreshing influence, and arose from her stupor; joy and gayety were awakened, and laughing pleasure banished every care.

The sun-beams penetrate, the sweet flowers spring up, the trees again look young, the budding beauties and the freshness of the verdure gladden the heart, and its joy is perfected in feeling the happiness of all around. Who can behold such a picture without emotion, or see it without thinking of the ineffable Being that produced it? The Lord breathes upon the earth and the valleys smile; he watereth them with his dew, and they are fertile. His presence ripeneth the harvests, and fills our hearts with joy. His blessing is upon the furrows, and the parching earth drinks of the refreshing rain, which softens it, and the seeds spring forth. The year is crowned with blessings, and the breath of God maketh the ground fruitful; under

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his steps flowers and fruits spring up, and all fruitfulness and abundance belong unto him. The pastures are watered with soft showers, and the hills are adorned with a beautiful verdure. The fields are covered with flocks, and the young corn rejoices the valleys. All nature rises in one general song of praise and thanksgiving to her bountiful Parent.

In the revolution effected by the mild influence of the spring, I seem to see the representation of that salutary change which the soul feels when it yields to the operations of the divine Spirit of God. Before this it had no real beauty; its faculties, perverted and depraved, were incapable of producing the precious fruits of piety, till the saving grace of God was felt in the heart, when it resembled the earth cheered by the vernal sun. Ignorance disappeared, the passions were controlled, and vice shrunk back ashamed; the heart glowed with virtue, and the mind was impressed with humility; and a firm reliance upon the blessed doctrines of truth.

MAY VIII.

GERMINATION OF SEEDS.

Many changes in the vegetable kingdom are now taking place under our immediate notice, whilst others are operating in secret, concealed from our observation. The grain which had been previously deposited in the earth swells, and the plant at length sprouts and gradually shoots up. As this is the beginning of all the beauties which spring and summer offer us in the vegetable kingdom, it merits some attention. Seeds are composed of different parts, according to the variety of species, the principal of which parts is the germ. Each germ has two parts; the one simple, which becomes the root, and the other laminated, which becomes the stem of the plant. The substance of most seeds is composed of two pieces called lobes, which contain a farinaceous matter, and serve as seminal leaves to the plants. Mosses have the most simple seed, consisting only of the germ, without pellicle and without lobes. To make seeds germinate, air, and a certain degree of heat and moisture are necessary. The augmented heat, and the difference observable in the taste and smell, seem to denote a degree of fermentation; and the farinaceous substance becomes fitted to nourish the tender germ. It has been ascertained by experiments made with coloured fluids, that this substance imbibes a moisture, which, in conjunction with the air and heat, forms a proper nourishment till the plant has acquired strength enough to make use of the juices furnished by the root. The lobes, exhausted of their farinaceous matter, gradually dry, and fall off of themselves in a few weeks, when the plant has no farther need of their assistance.

Consider herbs which grow on the mountains are of a particular nature; their duration being very short, it often happens that the

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seed has not time to ripen; and that the species may not be lost, the bud which contains the germ is formed upon the top of the plant, puts forth leaves, falls, and takes root. When the delicate plant shoots up from the earth, it will run too great a risk if it were immediately exposed to the air and influence of the sun. Its parts therefore remain folded close to each other, nearly the same as when in the seed. But as the root grows strong and branches out, it furnishes the superior vessels with an abundance of juice, by means of which all the organs are developed. At first the plant is nearly gelatinous; but it soon acquires more firmness, and continually increases in size. This short account of the germination of seeds suffices to show us how many preparations and means nature uses to produce a single plant. When therefore we see a seed that we have placed in the earth sprout, we shall no longer consider it as beneath our notice, but shall rather be disposed to regard it as one of those wonders of nature which have excited the observation and attention of some of the greatest of men.

MAY IX.

OF THE CHICK IN THE EGG.

We are under considerable obligations to those naturalists who have made laborious researches and investigations into the nature of generation, and the propagation of animals, by which much light has been thrown upon a very difficult subject. Nothing contributes more to the glory of God than observations which point out the wisdom manifested in the production of the animal creation. The less we are able to comprehend the works of nature, the more eagerly should we seize every opportunity that offers of inquiring into them.

The hen has scarcely sat upon the eggs twelve hours, when some lineaments of the head and body of the chick may be discerned in the embryo; at the end of the second day the heart begins to beat, though no blood can be seen. In forty-eight hours we may distinguish two vesicles with blood, the pulsation of which is evident; one of them is the left ventricle, the other the root of the great artery; soon after one of the auricles of the heart is perceptible; in which pulsation may be remarked as well as in the ventricle. About the seventieth hour the wings may be distinguished, and on the head two globules for the brain, one for the beak, and two others for the front and hind part of the head. Towards the end of the fourth day, the two auricles, now distinctly visible, approach nearer the heart than they did before. About the fifth day the liver may be perceived; at the end of one hundred and thirty-eight hours, the lungs and stomach become visible; and in a few hours more the intestines, veins, and upper jaw. On the seventh day the brain begins to assume a more consistent form. One hundred and ninety hours after incubation, the beak opens, and flesh appears on the breast. In two hundred and

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ten, the ribs are formed, and the gall-bladder is visible. The bile, in a few hours more, is seen of a green colour; and if the chick be separated from its coverings, it may be seen to move. Towards the two hundred and fortieth hour, the feathers begin to shoot, and about the same time the skull becomes cartilaginous; in twenty-four hours more the eyes appear; at the two hundred and eighty-eighth, the ribs are perfected; and at the three hundred and thirty-first, the spleen approaches the stomach, and the lungs the breast. On the eighteenth day of incubation, the first faint piping of the chick is heard. It then continually increases in size and in strength till it emerges from its prison.

By so many different gradations does the adorable wisdom of God conduct these creatures into life; all their progressive evolutions are arranged with order, and each one is effected by its own particular cause. If the liver is always formed on the fifth day, is it from the preceding state of the chick. No part of its body could appear sooner or later without some injury to the embryo, and each of its members appears at the most convenient time.

The wise and invariable order in the production of this little body, is evidently the work of supernatural power; and we shall be more convinced of it if we consider the manner in which the chick is formed from the parts which compose the egg. How admirable is that principle of life the source of a new being contained in the egg, all the parts of the animal being invisible till they become developed by warmth! What a wonderful order and regularity is observed in the formation of the chick; the same evolutions taking place at once in twenty eggs! Neither does changing the position of the egg at all injure the embryo or retard the formation of the chick; which at the time when it breaks the shell, is found to be heavier than the whole egg was at first. These, however admirable, are far from being all the wonders displayed in the formation of a chick. The microscope, and the penetrating investigations of the curious, have only discovered what comes more immediately under the observation of our senses: whilst the discovery of many things remains for those who are to follow us, or they may never be known in this state of our existence. Much remains to be known concerning the mystery of generation, which at present is impenetrable to our researches; but let not this discourage us, let us endeavour to improve and make a good use of the little knowledge we are permitted to acquire, and we shall yet have sufficient to feel the wise power of God, and to employ for the benefit of our fellow-creatures.

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MAY X.

BUDS OF FLOWERS.

A number of flowers in bud, and still enveloped in their covers, may be seen in every direction; all their charms are veiled, and their beauties concealed within themselves. Like these, devoid of beauty, may be considered the wretched miser, isolated and centring every thing in himself; his views are base and sordid; he refers all to himself, and makes his private advantages and personal gratification the centre of his desires, and the confined circle of his actions.

The vivifying rays of the sun will soon cause the buds of the flowers to expand, and, quitting their confinement, open their ripening beauties to the face of day. They will appear with a beautiful bloom, and exhale the most fragrant perfumes. So will the heart of the miser be opened when the rays of divine grace shall beam light upon his soul. His unfeeling nature and contracted mind will yield to the penetrating influence of truth, and his heart become susceptible of social affections, and alive to the feelings of humanity. He will then no longer be the slave of selfishness, nor the prey of sordid cares; his love will become universal; he will feel the affection of a brother for the deserving; and his generous soul will know no bounds in its expansion, nor suffer any restraint in cheering the comfortless, and ministering unto the afflicted.

When I view the yet tender buds of flowers, I think of you, ye amiable youth! The beauty and energy of your souls are not yet displayed; your faculties are not yet expanded; and the hopes of your fond parents not yet confirmed. When, walking forth into the fields and gardens, you behold the budding flowers, consider that you are in a similar state; as you look for their expansion, so your parents fondly watch the gradual unfolding of your faculties. They do every thing for you, and neglect nothing that can promote your instruction and advance your improvement; they watch over your education with the tenderest care, that at first by blossoms, and then by choice fruit, you may become useful to society, and be the joy of your parents, and their consolation and support in the evening of their days. Do every thing in your power to gratify their dearest hopes, and profit well by their instructions; to the end that you may become wise, amiable, and virtuous. And beware of following all the suggestions of youthful fancy, or giving way to the ebullitions of desire and the wild fury of passion, which will blast your innocence, destroy the sweet sensibility of your heart, and render your mind base, gloomy, and wretched. 'In the morning of life I flourish like the opening bud. My heart beats with joy, and throbs with fond delight; I riot in the luxury of hope, and anticipate with ecstacy the pleasures of futurity. But if I yield to the insinuating poison of young desires, and slide into the false sweets of pleasure, my heart would early pal-

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sate only to the tears of bitterness, or its vital stream be consumed by the ardency of an impure flame.'

MAY XI.

INDEFATIGABLE LABOURS OF THE BEE.

The season of spring affords us an excellent opportunity to observe the labours and industry of the bees; and the sight of a hive is certainly most beautiful. A wonderful degree of interest is excited in the contemplation of a laboratory where thousands of workmen are differently employed. Our astonishment increases as we behold the regularity of their labours, and the abundance with which these magazines are furnished for the support of their numerous inhabitants during the winter. And still more admirable is the indefatigable assiduity and unceasing labours of this little republic. Bees give an example of diligence and activity which is not only uncommon, but has perhaps never been equalled.

As soon as the last traces of winter have disappeared, they begin to come forth; sometimes so early that there is reason to fear the cold is yet sufficiently strong to injure their delicate limbs. Even before the juices of flowers which begin to open are sufficiently acted upon by the heat of the sun to furnish a large supply of honey, the bees collect a little for their subsistence. But as the spring advances, and in the summer, their cares and activity are redoubled: in these seasons they are never idle; they work incessantly, and neglect not the smallest profits that will increase their stores. They are so indefatigable in the construction of their cells, that we are informed a comb with double cells and sufficiently large to contain three thousand bees, is finished in twenty-four hours.

The work is jointly undertaken by all the members of the republic; whilst some collect the wax, and prepare and fill the magazines with it, others are busied in different labours. Some build cells with the wax; others knead and perfect it; some gather honey from the flowers, which they deposit in the hive for present nourishment and future support; others close the entrance of the cells with a covering of wax, in which they have preserved their winter's store of honey. Some distribute nourishment to the young ones, and close with wax the habitations of the small grubs that are near the time of their metamorphosis, to the end that they may work more securely. Some fill up with a glutinous matter all the holes and clefts of the hives, and plaster over the weak parts, that neither wind nor insects may gain admission. Some drag the dead out of the hive for fear of infection; and if the bodies are too heavy, they plaster them over with a glutinous substance, or with wax; and so cement it, that no effluvia can exhale through the coating.

'It is not enough for us to admire the activity of these little crea-

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tures; we should make them our model, and endeavour to imitate the example of their industry. We have many more incitements to action than they have; we possess an immortal soul. This should render our diligence constant, and our applications incessant, that we may avoid the way to ruin, and preserve the sure path to happiness: and nothing more effectually incites to this, than the reflection that the fruit of our labours lasteth for ever. The bee gathers its sweets not for itself only, but for its masters; while our labours in the vineyard of wisdom and of truth secure to ourselves the fruits of eternal life.

May we never be slow to do good, nor remiss in performing the duties of our vocation with all the zeal and fidelity of which we are capable. Let us execute without delay the task imposed upon us, and work while it is day, for the night cometh when no man can work. 'May we each show the same diligence to the full assurance of hope, unto the end that we be not slothful, but followers of them who through faith and patience inherit the promise; for the winter of age and the tribulation of sickness approach, and the hour of death hasteneth.' Look to the bees for instruction; consider their labours, and contemplate their works: admire their activity and unceasing industry. Always busy, always indefatigable, they rise with the morning, prolong their toils to the evening hour, and support without shrinking the troubles of their short life. And shall man repose in idleness, and lie on the lap of indolence? shall he, endowed with the immortal gift of reason, consume his days in frivolity, and waste his nights in foolish sports or hurtful pleasures? The period of our lives is short; may we devote it to labour for the glory of God, the welfare of our souls, and the benefit of our fellow-creatures!

MAY XII.

NOURISHMENT OF ANIMALS.

Through all the gradations and varieties of animals, from the ponderous elephant to the almost imperceptible mite, no terrestrial creature can live without food and nourishment. From the eagle that in her bold flight braves the meridian sun, to the minutest fly; from the whale to the smallest worm, nothing living can exist without sustenance. And in forming these creatures with the necessity of having food, God has provided at the same time such an abundance and diversity of aliment, that each creature may receive that nourishment which is most proper for its subsistence. As many different species of animals as there are, so many different kinds of food are destined for their nutriment; so that every creature upon the earth finds food adapted to its nature.

In this view we may divide animals into three principal classes. The first comprising all those which are nourished by the flesh of

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others: some of these, as the lion, prefer quadrupeds; others, as the pole-cat, fowls; others fish, as the beaver; and others insects, as different species of birds. The second class will comprehend those animals which derive their nutriment from the vegetable kingdom. Almost every species of vegetables is the food of some particular animal. Some prefer grass, others the fruit of trees: and among those which live upon the same plant, there is a great difference of choice; some preferring the root, others the leaves, the stalk, the seed, the fruit, and some are fond of the whole plant. The third general class includes the greater number of insects, the particular nature of whose aliment it is difficult to determine.

We may now see the propriety of these words of the Psalmist: 'All creatures look unto Thee, and Thou givest them their meat in due season. Thou openest thy hand, and satisfiest all things with that which they desire.' These cares of Divine Providence evince that eternal goodness which is diffused throughout the universe. If we reflect upon the prodigious number of animals which exist; the many thousand species of insects and birds; the millions of terrestrial animals in every part of the globe, that have their abode in the forests, in the fields, on the mountains, and in the valleys, in the caverns, and in the holes of the rocks, in trees, and in the earth; the innumerable shoals of fish that inhabit the ocean, the seas, the rivers, and the brooks; the infinite variety of insects, in the air, in plants, and on animals: each of which daily finds an ample support, and an abundance of food; we shall be lost in admiration at the wisdom of the munificent Creator, who nourishes them all, and gives to them severally the aliment most adapted to their nature. From this wonderful diversity in the food of animals, nothing that nature produces is useless, but tends to the support of some one of her numerous progeny. From all this we may draw a most happy conclusion; that if God thus provides for creatures destitute of reason, he will not do less for man, whom he has favoured with the blessed gift of reason, and to whom these animals are subservient.

MAY XIII.

SENSES OF ANIMALS.

In every animal the organs of sense are arranged in a manner most conformable to their nature and destination. By means of the senses they take cognizance of objects, whether near or at a distance; and through them they are enabled to provide for their wants, and to shun the dangers with which they are threatened. That sense by which animals are able to form an idea of material objects by touching them is called feeling, which is chiefly resident in the extremities of numerous nerves covered by the skin.

The organs of taste are the tongue and the palate; the savoury

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impressions are made upon the nervous papillæ, which are the immediate instruments both of taste and feeling, between which two senses there is considerable analogy.

The organ of smell is the delicate membrane which lines the inside of the nose; and by means of the ramifications of the nerves upon the membrane, the odoriferous vapours that float in the air are received; and those animals which require a more delicate and subtle smell have their olfactory organs more perfect. Worms seem to be destitute of this sense, as are in all probability fish and insects; though the antennæ of the latter may serve them instead. By means of smell, animals are enabled to hunt out their food, to select that which is most suitable for them, and, by being apprized of the approach of their enemies, to preserve themselves from danger.

By hearing, animals become susceptible of the vibrations of air; but the structure of the ear is not alike in all; some, as the lizard, have two tympanums; others are destitute of several parts common to the rest. Birds and fish have not that part called the meatus auditorius, and worms and insects are completely deaf.

The eyes are the organs of seeing. Quadrupeds, fowls, fish, and amphibious animals, have two eyes, one on each side of the head. Insects are generally furnished with more than two. The spider and the scorpion have eight; and many possess them by thousands, commonly collected in two orbits. In a fly sixteen thousand eyes have been enumerated; in a beetle, six thousand three hundred and sixty-two; and in a butterfly, thirty-four thousand six hundred and fifty. Fish have no aqueous humour; but the crystalline lens is nearly globular.

All the organs of sense are disposed in a manner not only most suitable to the structure of the body of the animal, but also to answer its different necessities. To be convinced of this, a few observations will suffice. As the eyes of many insects are immoveable, and consequently in many cases would be useless, nature has given them antennæ, by means of which they are informed of what would be injurious to them, or what might otherwise have escaped their sight. The eyes of fish are disposed with equal wisdom. An eye that projected far out of the head would be very inconvenient to them, and we find their cornea is nearly flat; to remedy the defects of this, the crystalline humour is globular, which in most other animals is lenticular, and much more flat. Though eyes are generally spherical, there is great diversity in their figure; and their situation in the head is various, according to the different destination and necessities of the animal. In man, who sees little but what is straight before him, the eyes are situated in the fore part of the head, but so arranged that they can receive impressions from the whole semicircle of objects before him. In birds, the eye is so placed, that it can take in at one view nearly the whole circle of objects around it, by which means they can provide their food more easily, and are less liable to be surprised by enemies.

The ear of man has that form which best suits his erect posture;

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in birds it is particularly adapted to occasion no impediment to their flight, and for this purpose it does not project, but is close, to allow of their rapid passage through the air. Thus, though we know but a small part of the wonderful mechanism of animals, we see enough to convince us of the wisdom displayed in their organization, and in the arrangement of their organs of sense. And the more information we gain, and the more discoveries we make upon this interesting subject, the more cause we find to admire the wonders of nature, and to adore the goodness of God. Let us not then treat any animal, however insignificant, with contempt or indifference; they all bear the stamp of divine impression, and like ourselves, have one common Parent, who is God over all.

MAY XIV.

ORDER OBSERVED IN THE SUCCESSION OF FLOWERS.

Every plant springs up in the earth in the order which is prescribed to it. There is a time appointed for one to unfold its leaves, for another to flower, and a third to fade and die. The snow-drop showed its delicate flower above the ground several weeks since, long before the trees ventured to unfold their leaves, even whilst ice and snow still covered the earth. The crocus next appeared, timidly shrinking from the impetuous winds; at the same time were seen the sweet violet and the auricula. These were the joyful harbingers of the numerous flowers that now refresh us.

At this period also a succession of flowers is observed, and every month exhibits new ornaments peculiar to itself. The tulip begins to develop its rich leaves and flowers; and speedily the beautiful anemone will form its full round cup, the ranunculus expand all the magnificence of its leaves, and the opening rose spread its beauties to the morning sun, and fill the air with its perfuming fragrance; nor will the elegant pink, with its graceful charms, be wanting in the beauteous assemblage.

By the wise arrangement displayed in the regular succession of flowers we derive the greatest advantages; for if they all flourished at the same time we should either have them in excessive abundance, or we should experience a total privation. But now, that each species has its determinate time and season, we can contemplate them at our leisure, and enjoy them with greater convenience; we can dwell longer upon their beauties, and examine each singly without the confusion of numbers. And by the constant succession of flowers we do not suffer from the shortness of their continuance; for the pain of seeing one die is solaced by the budding of another, and our gardens during a great part of the year present, as well as attract, the face of youth and beauty. The field of nature is open to all, and he who prefers the sting of thorns may gratify his inclination as

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well as he who delights in seeing flowers and sweet enjoyment attend upon all his steps. As flowers succeed to each other, so do the individuals composing the human race; as some are born, others are returning to their native dust; and as some are just beginning to be useful to the world, others are leaving the great theatre of life whilst new actors begin to play their parts.

MAY XV.

ZOOPHITES.

Zoophites may be considered as insects partaking both of the nature of an animal and a plant. By their external configuration, their remaining in one place, and their producing themselves by buds and seeds, they very much resemble plants; like which they also may be propagated by grafts and slips. Their animal nature is only known by their sensibility and voluntary motion. The greater part of zoophites put forth a kind of root in the sea and waters where they live; some of them grow in stony calcareous substances, and others are covered by a shell, which resembles horn, whilst many are soft and fleshy. They all possess in common the power of self-producing new zoophites; and whilst the young ones are attached to the parent stalk, they form but one animal; but as soon as they are separated from the stem, they have a proper existence by themselves.

Zoophites also multiply themselves in a way very similar to that of plants. They form a species of germ containing a young zoophite, which grows for some time on the stalk, and, at length falling off, becomes a complete animal. They do not appear to possess either brain, heart, veins, or arteries; but their whole body from the beginning to the extremity, forms a hollow tube, which may be regarded as one continued stomach or intestinal canal. By the discovery of this humble class of beings in the creation, in the beginning of the seventeenth century, the volume of natural history has increased, and our ideas of the gradation of beings extended. The links between animal and vegetable nature are extremely imperceptible, and difficult to define. The only distinguishing characteristic is supposed to be, that plants have neither sensation nor motion, whilst every species of animal both feels and moves; but the shades between these are so finely drawn, as in many instances to be impenetrable to the researches of the curious, who often assert for truth, discoveries which are only within the probability of conjecture.

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MAY XVI.

PLEASURES DERIVED FROM THE CULTIVATION OF FIELDS AND GARDENS.

The cultivation of fields and gardens is one of the most delightful of all occupations, and perhaps the only one the toil of which is recompensed with much pleasure. The greater part of laborious employments confine a man to his shop, or within his house; whilst he who devotes himself to agricultural pursuits breathes always a pure air, and enjoys continually the grand spectacle of nature. The azure sky is his canopy, and the earth embroidered with flowers his carpet. Far removed from the murky atmosphere of towns, a thousand beautiful objects present themselves to his view, and he need never want a pure spring of delight, or real banquet of pleasure. Soon as the first rays of morning beam light on the earth he rises with the lark, and hastes away to his fields, brushing, as he passes, the glistening dew-drops, and inhaling the fresh unbreathed air, sweeter than the rose's perfume.

The joyful songs of the birds gladden the skies, and they express their loves in a thousand sportful sallies. Their sweet carols mark the pleasure they feel in the new day, and the full chorus swells with the praises of the God of nature, whose blessings they again receive in the returning influence of the sun, in their food, and in the sweet attractions of love and gayety. And surely, no heart can remain unmoved amid this scene of joy and festivity; nor can the mind contemplate a more august spectacle than the perfection of God in the grandeur of his designs and the beauty of his works.

What contributes to render agriculture and gardening more particularly pleasing is the constant variety and succession of objects always presented to us, which relieve the wearisomeness of continued uniformity and undeviating sameness. We continually observe a vast variety of plants, fruits, herbs, and trees, grow up under our auspices, and assuming every diversity of appearance. Nature leads her followers through a thousand flowery paths, ever diversified by new changes and fresh delight. One while we see plants just peeping above the ground, at another those which have arisen and are fully developed, and others which are in full bloom. Whichever way we direct our view we see new beauties. The heavens above, and the earth beneath, contain exhaustless treasures and boundless delights. Let those who are from necessity confined within the walls of cities sometimes emerge from their smoky atmosphere, and respire a purer air in the country, where their hearts may be rejoiced with a pure and innocent pleasure, and their souls rise up to heaven in aspirations of praise and gratitude to the Author of every blessing.

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MAY XVII.

THE TULIP.

The tulip is one of the finest formed and most beautiful of flowers; the fineness of its shape, and the brilliancy of its colours, make it the queen of the garden. And if we consider that each year millions of them blow, all differing in form and beauty, our admiration increases, and we are compelled to acknowledge that so much beauty and elegance cannot be the effect of blind chance, but must have some great First Cause which has produced them in its wisdom and beneficence, the existence of which is sufficiently proved by the tulip in full flower.

Though tulips are now produced from roots, there was a time when they did not exist; and whence was derived the first bulb, and that primitive arrangement of which all subsequent revolutions are only the development, but from some intelligent cause which we call the Creator? As much power and wisdom are displayed in the structure of a single tulip from which ten others shall proceed, as in the creation of ten at once. Whenever we see a bed of tulips, then, let us not rest satisfied with admiring their beauty; let us also admire in them that wisdom which has formed them with such perfection.

Though the beauties of the tulip are thus so eminently conspicuous, they lose some of their value when we consider they are only to please the sight, for not being odoriferous they cannot gratify the smell; and when we contrast them with the pink, which to beauty of form adds the most exquisite perfume, we forget immediately the richness of the tulip. And this is the case with those vain people, who, endowed with personal charms, set them off with every additional ornament their vanity can suggest; whilst they neglect, and suffer to remain uncultivated, the powers of the understanding and the virtues of the heart, which alone can render them acceptable to their Maker, and amiable to their fellow-creatures. The beauty of the tulip fades, and the pride of person is laid low: but the beauties of the mind remain to cheer, to delight, and to instruct, when the graces of form are no more; and the virtues of the heart will flourish, when the elegance of shape and the vigour of body are decayed.

The simple annals of plants furnish us with this useful observation, that the more beautiful a flower is the sooner it fades. We shall soon see no more of the tulip than a dry and dead stalk; its beauty and life only last a few short weeks, when its charms are destroyed, its leaves wither, its colours fade, and all that remains of what so lately struck us with its beauties is a sapless stem. Thus we learn from the tulip the little dependence that is to be placed on external advantages; we witness the frailty of beauty, and the short duration of life. For like the flower of the field man groweth up and flourisheth, and then speedily withereth away; his days are few and full of troubles.

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And may we so live, that when the awful period arrives, the good and the virtuous may regret our loss, and the afflicted and fatherless mourn for our dissolution.

MAY XVIII.

REFLECTIONS ON GRASS.

Though the flowers which the care and industry of man cultivates in the gardens are extremely beautiful, we should know little of the vegetable kingdom if we confined our attention to the contemplation of flower-beds. Every field is equally the wonderful scene of the works of God, and equally claims our attention. Can any thing be more astonishing than the great quantity of grass which grows in one meadow? To be convinced of the prodigious number of blades of grass, we need only attempt to reckon them as they are growing in any given space, and we shall soon be satisfied of their superior fertility over all plants and herbs. All this for the subsistence of various species of animals, of which fields and meadows may very properly be considered as the granaries.

Another great advantage to be considered in grass is the little care it requires in its cultivation; and that it will grow and perpetuate itself independent of the labours of man. Since the Almighty Word of God said, 'Let the earth bring forth grass, the herb yielding seed, whose seed is in itself,' our fields have been uninterruptedly fertile, and we have known no deficiency of grass. Its colour is also the most grateful; for who could have borne the dazzling lustre of white, or the brilliant glare of red? If the universal colour had been more dark or obscure, how gloomy and dismal would have been the face of nature! But the ever-bountiful Creator has neither injured our sight with colours which our eyes could not support, nor pained it by obscure gloom; on the contrary, he has clothed the fields in colours that strengthen the sight, and please by their diversity: for such is the difference of shade, that scarcely two blades of grass can be found of exactly the same shade of green. By this arrangement of the vegetable kingdom God has not provided less for our pleasure than for our advantage, the proofs of which every where present themselves to our observation: and may we never pass them with indifference or disregard, but may our reason ever be employed in tracing out the perfection of wisdom, and the consummation of goodness, in all the works of nature!

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MAY XIX.

SENTIMENTS EXCITED BY THE CONTEMPLATION OF THE HEAVENS.

What Being can have formed the superb vault of heaven? Who has given motion to those immense globes of light, whose continuance is perpetual, and velocity inexpressible? Who has commanded the vast masses of inert matter to assume so many and various forms? Whence are derived the connection, harmony, and beauty, of the whole; and who has determined their proportions, and set limits to their number? Who has prescribed to the planets laws which, during the lapse of ages, remained undiscovered till the sublime genius of a Newton unfolded them? Who has defined the vast circles in which the various stars roll in endless spheres? And who first commanded them to move, and continue their course in uninterrupted progression? All these questions lead us to thee, our adorable Creator! Self-existing, infinite Being! to thy intelligence and supernatural power all these heavenly bodies owe their existence, their laws, arrangement, force, and influence!

What sublime ideas the contemplation of these grand objects raises in our souls! If the space where so many millions of worlds are revolving cannot be measured by our understanding; if we are lost in astonishment at the magnitude of the spheres; if the edifice of the universe, which the Almighty has formed, be so immense that all our ideas are confounded in its contemplation; what must Thou be, O God, and what understanding can comprehend thee? If the heavens and all their hosts are so majestically grand and beautiful that the eye is never satiated with their splendour, nor the mind satisfied with the contemplation of their wonders, what must Thou be, O God, of whose glory these are but faint shadows and feeble images? What must be the infinity of Thy powers and the extent of Thy wisdom, when Thou seest at one glance all the immense space of Heaven, with its revolving worlds; and when thou penetratest into the nature and properties of every existing being! Thou who hast formed these admirable plans, who hast calculated every thing, and weighed all in thy balance; who hast established the laws of the universe, and proposed to Thyself the most sublime ends: in the contemplation of Thee I am lost in sublimity, and prostrate myself before the throne of Thy glory, unable to behold Thy refulgence!

MAY XX.

FECUNDITY OF PLANTS.

The magnificence of the terrestrial part of creation is never more conspicuous than when observed in the astonishing fertility of plants.

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A single plant produces millions of others. One tobacco plant produces forty thousand three hundred and twenty grains of seed; and if from this we calculate the produce of four years, we shall find that there may be produced two millions six hundred and forty-two thousand nine hundred and eight billions, two hundred and ninety-three thousand three hundred and sixty-five millions, seven hundred and sixty thousand grains of seed. An elm of twelve years' growth often has upwards of one hundred thousand grains of seed; and what a prodigious number must spring from these in the course of a few years! Suppose it has not more than one hundred thousand buds, and that the shoot of each year contains only five, there would be every year five hundred thousand plants which may be considered as new. If we add what is produced by the extension of the root by grafts, &c. we shall be astonished how the earth finds means to support the numerous family of plants.

We must also recollect the innumerable multitude of animals that receive their nourishment from the vegetable kingdom; they annually make so great a consumption of plants, that if nature had not endowed vegetables with very extraordinary prolific powers, we should soon have reason to be apprehensive of their total destruction. Sometimes indeed the very animals that devour them are instrumental in their propagation: birds, for instance, in eating the fruit, often swallow the kernels, which they afterward deposite in the earth without any injury; and whilst pecking certain fruits, they often scatter the seeds to a considerable distance; and this dispersion is requisite, that one species of plant may not occupy a whole field. For this purpose also, certain seeds are furnished with a sort of wings, that they may be more readily dispersed by the wind.

Plants are much more prolific than animals; of which we shall be fully convinced by comparing them together. Plants annually produce many new ones, and sometimes continue to do so for centuries; whilst the largest animals, as the elephant, the mare, &c. only produce one, or at most two, yearly; and are often entirely barren. Small quadrupeds, as the dog, the cat, the rat, &c. though much more fruitful, by no means equal the fecundity of trees. Fish and insects approach nearer to it; the tench deposits about ten thousand eggs, the carp twenty thousand, and the cod a million. But if we compare this fecundity with that of the wild rose, of the mustard-tree, and the fern, we shall find that these and many other plants multiply much more than fish or insects; besides, they are propagated by many different ways, whilst most animals are confined to one mode of multiplying their species. A tree may produce as many new trees as it has branches and leaves.

From these considerations we may learn how wisely God has regulated the continuation of the vegetable and animal species. If the multiplication of vegetables were less considerable, many animals must perish for want; our fields, meadows, and gardens would be entirely desert, or enlivened with a very few plants scattered up and down; and had the Creator thought fit that the animals which live

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upon vegetables should become more numerous than the plants, the vegetable kingdom would be exhausted, and many species of animals would perish. But from the wise relations subsisting between the two kingdoms, the inhabitants of each multiply in a just proportion, and no species is destroyed. Thus, pleasure and abundance every where surround us. For man, the Creator has given to vegetables their fecundity; and for his nourishment, pleasure, and health, such a multitude of plants are produced, that their number cannot be expressed; and thus affords an image of the immensity and omnipotence of God, who through all the kingdoms of nature opens his hand and satisfies the desire of every living creature.

MAY XXI.

DESCRIPTION OF THE BEAUTIES OF SPRING

Nothing is more worthy of admiration than the revolutions effected throughout all nature by the influence of the spring. As autumn declines, every valley, every meadow, and every grove, presents us with an image of death: and in winter nature is entirely divested of beauty; every animal is sorrowful, the inhabitants of the groves hide themselves and are silent; the earth becomes desert, and all nature seems to suffer a state of torpor and insensibility. However, at this very time she is working in secret, though we are ignorant of the happy principle which is preparing her renovation. Life returns to animate afresh the benumbed body, and every thing prepares for a similar restoration. In trees alone, what a multitude of changes take place. At first the sap, which during the winter had entirely abandoned the trunk and branches, slowly rises in the small vessels by means which we cannot discover: it soon penetrates the buds, which disclose a thousand wonders; the leaves with their beautiful green; the branches which are to shoot between the unfolded leaves, with new buds attached to them, and full of invisible leaves; the multitude of flowers, with the sweet exhalations which scent the air; in these blossoms fruit, and in those fruits the seeds of an infinite number of other trees.

The brightness of the sun rejoices the soul, and the activity of nature in the plants which surround us is highly pleasing. Every field delights with its beauties and pleases with its grateful fragrance, and every bird pours forth its varied melody. How cheerful are the notes of the linnet as it flutters from branch to branch, as if to attract our regard! The lark joyfully soars aloft, and hails the day and the coming spring with her melodious strains. The cattle express the vigour and joy which animate them; and the fish in the rivers, which during winter were torpid and lay at the bottom of the water, now rise to the surface, and express their vivacity by a thousand playful sallies.

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How is it possible that we can so often see all these objects without experiencing the most profound admiration and reverence for the infinite Being whose power is so gloriously manifested? Never should we breathe the pure air of spring without such feelings being awakened; let us never contemplate a tree in leaf, a field waving with corn, a flowery mead, a majestic forest, or a beautiful garden, without reflecting that it is God who has given us the shade of the trees, and the beauty and fragrance of the flowers; that it is He who clothes the woods and the meadows with the verdure which delights and refreshes; and that He, by whose will and power we exist, has given to every creature life, and all the happiness they enjoy. As nature feels the influence of spring, so the true Christian feels ecstatic bliss, when after having hidden his face for a while, his God approaches and breathes into his soul the happy testimony of his grace and salvation.

MAY XXII.

LANGUAGE OF ANIMALS

Man may be considered as the only animal which enjoys the gift of speech; and in this his superiority over other animals is most especially manifested. By means of speech he extends his empire over all nature, and raises himself towards his Divine Author, whom he contemplates, obeys, and adores. By the faculty of speech he is enabled to make known his wants to others, and to render them subservient to his interest. All animals, except man, are deprived of this faculty, because they are destitute of that reason by which we are enabled to acquire languages, and to know the use of speech. But as animals possess the power of expressing their wants and feelings by natural signs, and certain sounds or cries, we must allow them a sort of language, though very inferior, formed entirely from the diversity of the tones which they utter.

To form a just idea of this, no very laborious researches or profound investigations are necessary; it will be sufficient to observe the animals which daily come under our notice, and with which we live in familiar intercourse. Let us examine the hen and her chickens; when she has found any thing, she calls and invites them to partake of it; they understand her call, and instantly come. If they lose sight of her, their plaintive cries express their distress, and the desire they have for her guardian presence. Observe the different cries of the cock when a stranger or a dog advances, or when some bird of prey hovers near; or when he calls to or answers his hens. Hear the lamentable cries of the turkey, and see the young brood instantly hide themselves; the mother anxiously looks upward, and what has she discovered! a black point that we can scarcely distinguish; and this is a bird of prey, which could not escape the vigilance and piercing

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eyes of the mother carefully watching for her flock. The enemy disappears, and the hen utters an exulting cry; her anxiety ceases, and the young ones again joyfully assemble round their mother.

The cries of the dog are very various, copious, and expressive: who can witness without emotion the joy which this faithful animal expresses at the return of his master? He leaps, dances, runs about him with eagerness; now stops and eyes him with the most earnest regard, full of tenderness and affection; approaches, licks, and caresses him repeatedly; then again renews his frolicksome gambols, disappears, returns, assumes a variety of sportful attitudes, barks, and declares his joy by a thousand playful gestures. How different are these joyful sounds from those which he utters at night upon the approach of a thief! If we follow a hound or a pointer, how different will be their cries and their motions, according to what they wish to express, and how significant are the movements of their ears and tails.

This may afford us another opportunity of admiring the wisdom of the Supreme Being, who has thus manifested to all creatures his tender cares, by giving them power to express by sounds their feelings, and their wants. From their peculiar organization it is impossible for them to utter the language of man; but though destitute of that qualification, they are, through the mercy of God, enabled to communicate their sensations to one another, and even to man himself. They possess the faculty of producing and varying a certain number of sounds, and the structure of their organs is such, that each species has peculiar tones by which it conveys its meaning, with as much perfection as their nature and the end for which they are created requires.

How superior then is man to other animals by his powers of speech! Their language consists in the utterance of imperfect sounds; they are incapable of combining and comparing ideas, and their knowledge of external objects is very limited; whilst man possesses faculties which enable him to ascend from particulars to general notions, and to separate the object from the qualities which distinguish it; and having obtained this knowledge, he is enabled through his powers of speech to convey it to other individuals. Let us then pour forth the tribute of our praise to the Almighty for the superiority of our nature, and the great faculties he has bestowed upon us; never forgetting that the most grateful incense which ascends to Heaven is the prayers of the afflicted for those that comfort them; and the blessings of the ignorant who have been rescued from the bondage of darkness, and restored to the cheerful precincts of day by the superior intelligence of a fellow-being who has devoted his days to the cultivation of his mind and the improvement of his heart.

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MAY XXIII.

NUMBER AND MAGNITUDE OF CREATURES UPON THE EARTH.

'The works of the Lord are vast and numerous:' we should have acknowledged this if we had only known those which the earth contains; for how immense is this globe, the abode of so many nations differing from each other; and how many solitudes and deserts are still uninhabited by man! What is still more striking is, that the solid earth does not occupy near so much space as the water; and if the earth itself is an example of the greatness of the works of God, how much more so is that diversity of creatures which it contains!

We find innumerable species of stones, minerals, and metals, concealed in the bosom of the earth; whilst an astonishing variety of trees, plants, herbs, and fruits, adorn its surface. Notwithstanding all the care which has been taken to observe and classify their different species, the work is still far from being completed. 'Let us next consider the extreme diversity of living creatures which offers itself to our attention! How great the disproportion between the eagle and the fly, the whale and the gudgeon, the elephant and the mouse! and yet the interval which separates them is filled up with living creatures. The various species of animals approach each other so nearly that it is sometimes difficult to distinguish them; and yet these are so multiplied, that from the fly to the elephant they form one vast chain, all the links of which are connected. On the seas, lakes, and rivers, upon the surface of the earth and within its bosom, there is scarcely any space that is not occupied by some living creature.

But however great may appear the number of creatures which come under our observation, it is not to be compared with those which are so small as to elude our perception. With the microscope almost incredible discoveries have been made, of which all who choose may convince themselves. By its means we are presented with a new world, which was before entirely unknown to us; we there see living creatures whose extreme minuteness the imagination can scarcely imbody, some of them not equalling in size the millionth part of a grain of sand. And it is not only their number and diversity, but their beauty and delicacy of structure, which excites our astonishment. What nearly escapes the naked eye, when viewed through a microscope has an inconceivable fineness and beauty. Brilliant particles, which art cannot imitate, glitter in a grain of sand, and particularly in some insects; for example, in the head and eyes of a small fly; and we observe in the structure of the most insignificant of beings the utmost symmetry and most admirable order: in short, we find millions of creatures so small that the eye cannot distinguish them without a glass, which have, notwithstanding, an organization as perfect in their species, and are as proper to fulfil the design of their creation, as the larger animals with which the earth is peopled.

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Considerations like these are well calculated to teach us the knowledge of our own littleness; we seem to be lost in this innumerable multitude of the creatures of God, which would amply suffice to declare his power, though the whole human race were swept into annihilation. How immense is the empire of nature! in every element are beings created and preserved; every grain of sand is an habitation for insects which rank amongst the creatures of God, and are links in the vast catenation of created nature. The more we meditate upon the grandeur and diversity of the works of God, the more we feel the limits of our understanding, and our ideas are confused by infinitude; though we add number upon number, we shall never be able to find a sum equal to the amount of all the creatures which inhabit the earth. Let us then in silent reverence adore the wisdom of the immeasurable God.

MAY XXIV.

SPRING AN EMBLEM OF THE FRAILTY OF HUMAN LIFE, AND AN IMAGE OF DEATH.

At this season we need not search far for images of frailty and death; they every where present themselves connected with the beauties of nature. The design of the Creator in this seems to be, to warn us of the inconstancy of terrestrial things, and to check that dangerous inclination which we have to place our affections upon objects which, being vain and transitory, should be repressed. Spring is the season in which plants receive a new life, and in which many of them perish. However serene are the days of spring, they often suddenly become darkened by clouds, by showers, and by tempests. Sometimes the morning dawns in the fulness of beauty; when, ere the sun has gained the mid-heaven, the lustre which flattered our hopes of a fine day vanishes from our view; at other times our most favourable hopes are realized, and we enjoy all the attractions of spring in full perfection. But how fugitive are these happy days, and how precipitate their flight! Whilst we are eagerly courting their presence they vanish from our grasp; and thus fly the fairest hours of life, even as fleeting moments of spring. The morning often meets us with smiles, and promises us nothing but joy and happiness; but ere the evening comes, even before we have attained the noon, we experience the desolation of misfortune, and the bitterness of grief; wo marks our course, and affliction follows our steps.

Let us pause for a space, and consider the years of our youth, which we may regard as the spring of our life; how fleeting were the pleasures of our then tender age! Many and various as they were, perhaps none of them now remain. Where are fled those happy moments when, strangers to care, we gave ourselves up to the intoxicating influence of joy, and the enthusiastic rapture of unrestrained

imagination? Where is now that gayety of heart that was wont to sparkle in the countenance and cheer the admiring beholder? And where those roses which once bloomed in our cheeks? We now no longer feel the turbulence of pleasure, the enthusiasm of ardour, nor the rapturous fervour of delight, which were wont to fire our senses and intoxicate our souls. We remember those happy days no more, but as the illusion of a dream, or as some pleasing phantasy that plays upon the imagination, and suddenly leaves us in all the consciousness of a weary existence. But it is not so with those who in their morning of life looked forward to the time when to learn is painful, and again to grow young impracticable; who, instead of expending the ardour of youth in the pursuit of tasteless frivolity or hopeless dissipation, gathered with unceasing toil and unwearied assiduity the rich stores of wisdom, the enjoyment of which will ensure to them a measure of felicity, whilst the mere butterflies that flutter in the sunbeams are buried in the gloom of oblivion.

Every where does the spring declare, in the expressive language of truth, the decay of life and the uncertainty of time. We now see the trees in the pride of verdure, adorned with their beautiful blossoms; but in a few days these will be no more. All those tender flowers, whose beautiful forms diversify nature, will perish in the same season that gives them birth. Like these, the period of human life is short, and its longest duration may be compared to a day of spring. Death suddenly closes our eyes in night, even when the crimson tide of health promised us the succession of many years. Often the canker worm of disease is secretly gnawing the heart, whilst the countenance yet beams the lustre of health and the radiance of youth. Yet, though the charms of youth are blasted, as the glory of the valleys is sometimes darkened by the north wind, or as certainly as the pride of the garden fades; though we fall like the rose which blooms to-day, and to-morrow withereth; let us not repine nor mourn at our fate; but let us enjoy all the charms of spring, and the blessings of life, which the Creator has graciously bestowed upon us. The thoughts of death can never destroy the pleasure of the virtuous, nor lessen the delight of innocence and the enjoyment of purity. Far from filling the mind with dismay, and rendering gloomy the heart, the certainty of death teaches us the insignificance of all terrestrial objects, and leads us to repose upon the Supreme Being, in the hope of quitting a world where every thing is perishable, for the regions of eternal glory and endless felicity.

MAY XXV.

SPRING EMBLEMATICAL OF THE RESURRECTION OF THE BODY.

Most of the flowers which we now admire, and which so beautify the earth, were lately rough and shapeless roots. This may present

us with a beautiful emblem of the resurrection of the righteous, and the reanimated state of their bodies. As the roots of the most exquisite flowers, while buried in the earth, are destitute of form and beauty, but when in bloom have a thousand charms—so the human body, which in the precincts of the tomb is the object of horror and aversion, in the day of resurrection will experience a most astonishing change; 'for what is sown in corruption is raised in incorruption; what is sown in dishonour is raised in glory.' As soon as the first mild days of spring appear, life and joy succeed the melancholy impressions excited by the rigours of winter; and cause the chilling blasts to be forgotten. So will man in the great day of resurrection forget all his troubles, and no longer remember with pain the afflictions of his past life. Whilst in this state of existence, anxiety lowers on our brow, and our countenance often expresses the language of sorrow; but soon as the cheering rays of a new creation shall enlighten our souls, grief will be no more; no clouds will obscure the serenity of our days, and a heavenly joy will gild all our moments.

Spring is the joyful season when the earth undergoes a general renovation; if in the winter it seemed dull and lifeless, it now appears altogether gay and attractive. Every object delights us, and we seem each spring to enjoy the pleasing variety of a new world. So also in the day of resurrection will the just man be transported into a new and delightful region. The new heaven and the new earth will be free from all the evils which now so often trouble us; peace, order, beauty, and justice, will render our future abode more happy than the most ardent imagination can conceive to be possible.

When the heat of the sun's rays has penetrated the earth, thousands of plants and flowers rise up out of its bosom. So will it be on the great day, when thousands of generations shall arise from the dust in which they have been buried. As the flowers of spring come forth from their seed decked in beauty and splendour, so the bodies of the righteous which have been deposited in the earth shall one day arise, encompassed with glory and arrayed in beauty. Spring is the epoch of vegetation for grass, flowers, and every species of plants; it is then that every thing which has pushed above the surface of the earth developes itself more and more every day, and visibly increases its strength and beauty: and the day of the resurrection shall be to the soul of the Christian the epoch of the boundless progress he will make in all good; no weakness will detain, no obstacle impede him on his way in the path of perfection; he will proceed from virtue to virtue, and from felicity to felicity. In spring all nature seems to arise as from a state of sleep to praise its Author; the notes of all the inhabitants of the air swell in one universal hymn to glorify the Being who formed them; and, in the joyful hour of resurrection, similar songs shall ascend from the children of God, who have received new life and immortality.

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MAY XXVI.

ATTRACTIVE POWER OF BODIES.

We often see two bodies approach each other without being impelled by any external force. The cause which produces this effect is called attraction, or that principle whereby the minuter particles of matter tend towards one another. This power of attraction is one of the principal agents of nature; by its operation fluids ascend in capillary tubes; and it is in some degree the cause of the juices circulating in the capillary vessels of plants and animals. The expansive power of the air also contributes in plants to this effect, for a portion of air is found in the fluid by which they are nourished. Vegetables are also provided with air-vessels, which imbibe the external air, and assist the ascent of the sap; but the chief cause of this phenomenon is capillary attraction. It is well known that a series of capillary tubes exist in the human body, where the fluids are in continual motion; and this motion is partly regulated by the laws of attraction. Many of the phenomena we observe in the material world have this attractive power for their principle, and by it is most satisfactorily explained the motion of the heavenly bodies. These spheres, separated from each other by immense intervals, must be united by some secret bond, to form such a perfect whole as the solar system. It is now generally admitted, that the union of these heavenly bodies, their direction, the law which prevents them from deviating from their prescribed route, the motion of the planets and the comets round the sun, all depend upon the attractive power of that star, and the gravitation of these bodies towards him. How admirable is that wisdom which, by means of the same law, causes the vegetation of grass and the motion of the universe!

All these reflections lead us to glorify the Supreme Wisdom. If it manifests itself in the government of the celestial bodies, it is equally apparent in that of rational creatures. The Creator always acts upon principles equally wise, after the same laws, accomplishing every thing with the greatest simplicity. But we are often so blind as not to acknowledge him, because we imagine that he only appears in things which possess grandeur and brilliancy. When cities and provinces are devastated by an earthquake, inundated with water, or consumed by fire, our attention is arrested; and in these convulsions of nature we perceive the traces of Providence. But why do we not perceive him equally in small things? why do we not behold the marks of his wisdom in the common occurrences of life? Is it only extraordinary events that proclaim the power and justice of God? Is it not equally displayed in the smallest blade of grass as in the motion of the heavenly bodies? To be convinced of the wisdom and goodness which are manifested throughout the kingdom of God, we need not go to distant places, or seek amidst remote objects. We

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need only dwell on what relates to ourselves, and the particular dispensation of Providence in our own behalf.

MAY XXVII.

COMPLAINTS OF MEN AGAINST THE LAWS OF NATURE.

'Why is the human body, from its constitution, subject to so many accidents and infirmities?' Let him who asks this question say, if it is possible to figure to himself a body which can unite more advantages than that which he has received from his Creator! It was incompatible with the nature and catenation of things below, that man should be provided with a body that was invulnerable. Though some are deformed, others lame, and deaf and dumb, we have no reason to murmur at the decrees of Providence. These defects are not so frequent as to give us occasion to repine; and those who are still disposed to complain would do well to reflect on the following truths.

It is useful to the generality of men that some examples of the defects to which the human body is liable should now and then occur; for when a healthy and sound person compares himself with one who is not so, he at once perceives all the advantages of perfect and well-formed limbs; he learns to prize a gift of whose value he was before ignorant, and is more careful to preserve it. How precious is each eye, each organ of sense, each joint and limb—more dear to us than the richest treasure! Our body is more beautiful and regular than the most superb building, more excellent than the most exquisitely wrought machine; and yet, inferior as these are, we are far from attributing them to blind chance.

'Why are some countries of the earth so different from one another; sometimes cold, sometimes wet, sometimes low, at others elevated?' If thou, O man! hadst the power of forming a globe, where every thing should contribute to the welfare of men and animals, would thy understanding furnish thee with the plan of one better than that of our sphere? The countries of the earth produce, by means of their diversity, exhalations and different winds, from which results that medium of air, which experience teaches us is best adapted to the health and comfort of animal life, and the promotion of vegetation. 'It is, however, incontestable that the variations of weather are not advantageous to all men and to all countries.' But has not the weather which has preceded an influence upon that which follows? and the temperature of one country an influence upon that of another? Is it in our power to judge of the whole? Are a thousand husbandmen to sigh for a shower, because the continuance of a drought will accommodate the arrangements of *one* housewife? A certain state of air will occasion in some places a degree of sterility; but can that be called an evil which prevents the impurity of the atmosphere? Should an east wind, benefiting a whole country, cease

to blow, because from its violence some ships are wrecked, and some particular people injured? Is it just or reasonable to blame or remark imperfections in a part, when we cannot comprehend the whole? 'Why are there so many noxious animals?' Does any one think that no rapacious animals should exist upon the earth? Let such people reflect, that, by the beasts of prey, the number of animals which would be troublesome to us is diminished. And it is because many animals serve for food to beasts of prey, that the number of living creatures is preserved. If these rapacious beasts did not exist, the carcasses of the animals they devour would be rather prejudicial than useful. The animals thus devoured are replaced by others, and the population is regulated by the means of subsistence; hence flies and many insects would perish from want, if the animals which feed upon them did not thin their numbers.

'Whence is it that the Creator has regulated the course of nature by such invariable laws? Is it not precisely by means of this arrangement that man, assisted by nature and guided by experience, is enabled to make use of his understanding and of his powers, and become in some degree the worker of his own good? Would we wish to dwell in a world where we should have no occasion for activity; where none of our pleasures could be increased by any exertions on our part; where there was no rule or fundamental law; and where the alternations of good and evil, of pleasure and of pain, being unknown, we should have nothing to render us attentive to the laws of nature?

There will ever be a number of things in nature, the designs of which, and the relations they bear to each other, must remain concealed; and we may find some, which, to our limited understanding, appear contradictory, and little adapted to the plan of the Deity. But in such cases, let us bear in mind that God performs every thing with the wisest and most beneficent views; and when any doubts and difficulties shall arise, let us say with the apostle—'O the depth of the riches both of the wisdom and knowledge of God! How unsearchable are his judgments, and his ways past finding out! For who hath known the mind of the Lord? Or who hath been his counsellor? For of him, and through him, and to him, are all things; to whom be glory for ever. Amen.'

MAY XXVIII.

OF THE SINS TO WHICH WE ARE MOST PRONE DURING THE SPRING.

Is it possible that we can profane, by sin, that season which of all others should more especially animate us to the practice of piety? Is it not natural to suppose that in these beautiful days every field would be a temple where we might offer up the incense of a grateful heart,

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and the thanksgiving of a virtuous mind; where every thought, sentiment, and action, should tend to the glory of our Creator? But, alas! we daily witness the ingratitude of men towards their heavenly Benefactor; they see nature renewed, they see the flowers that had decayed revive, and a variety of pleasing objects every where attract their notice, without ever thinking of their Maker, and rendering unto him the just praises of his excellence. This odious vice of ingratitude, the source of much iniquity, is most evident at this season; and shall man, the only creature in the universe capable of reflecting upon his happiness, be the only one insensible to it?

It is to such an unfeeling and ungrateful soul that I now address myself; but I can scarcely expect my feeble accents to penetrate within the recesses of thy heart, when the voice of God has been heard in vain, and the energetic and expressive language of nature disregarded. Canst thou forget thy Creator, when all his works declare him? If thou knowest not thy God, thou canst neither know thyself nor the world in which thou livest. Every creature reminds thee of its Author; every place in the vast dominion of nature is full of the Deity. He manifests himself in every blade of grass; in every flower, and in every bird, he speaks the sweet and persuasive language of nature: he addresses himself to thy senses, to thy reason, to thy conscience, and to all thy faculties. Listen to this language, and thou mayest become sensible and grateful.

How dost thou employ these fine days of spring? Surely thou shouldst emerge from thy chamber and visit the treasures of the fields, and the beauties of the gardens, where thou mightest inhale a pure and balmy air. But beware of yielding to the extravagance of sinful pleasures; in whose train follow anguish, disease, and infamy. Truly to enjoy the beauties of spring and all the delights of the season, is to observe with attention the works of nature, whilst thy reason informs thee of the power and wisdom of the Creator there displayed; thy heart will then experience raptures infinitely superior to the pleasures of those who forget their God.

Let us now turn our attention to those who in this season are the slaves of care, and fear they shall not be able to find the means of subsistence. O ye of little faith! Behold the lilies of the field how they grow; consider the fowls of the air, they sow not, neither do they reap, yet their heavenly Father feedeth them. Be assured, then, and put your full confidence in God. Spring is the season of hope, give it a place in your bosom; and when doubts shall assail, and fears come upon you, cast your view abroad over the fields and meadows, and remember the words of your Redeemer: 'If God so clothe the grass of the field, if he feed the fowls of the air, how much more will he nourish thee, O thou of little faith!' The wicked only have cause to fear for the future; but he who unites integrity to industry, and virtue to intellect, will ensure unto himself a portion of comfort here, and ever-during felicity in the world to come. Let us then rejoice in our existence, and while we employ this delightful season of the year in contemplating the works of nature, look up with joy and

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gratitude to him who has given us the glorious privilege above millions of other creatures, of knowing the God of nature is the sole author of all happiness.

MAY XXIX.

HARMONY OF BEES.

The comfort and happiness which bees enjoy are in a considerable degree owing to their harmony and patriotism. At least, it is evident that their community must be immediately destroyed if they did not live together in a state of union. From the observations of those who have investigated this subject, it appears that these insects return to their hives laden with materials for building their cells, and there are others in waiting to ease them of their burden. They again sally forth, and whilst they are collecting fresh materials, those which remain in the hive knead together the little parcels which the others have brought, and thus prepare a mass proper for building. Others, which are not immediately employed in working, render kind offices to the labourers, and bring them food, that the work may go on without interruption.

The patriotism of bees is not less than their harmony. The wealth of the whole state consists in the riches of each citizen; and this numerous republic forms but one family, in which is no personal interest, no avarice, and no rapine: here no troop of bees unites to do violence to, or fight against the interests of, each other; no bee is ever found living in luxury and superfluity, whilst another is destitute of the necessaries of life; nor are they anxious to acquire more honey than will suffice for their winter's provision.

Insignificant as these insects may appear, we may learn from them those virtues upon which depend the repose and the happiness of our lives. In whatever state or condition we may be placed, it is necessary for us to act in concert with our fellow-creatures, and to cultivate the virtues of patriotism: the society in which we live, Christianity, and our own happiness, demand it. Let us cheerfully bear our part of the general burden, and, if it is necessary, charge ourselves with the burden of another, who, from ignorance or weakness, is unable to support it. And when our duty, our conscience, and our religion, require us to make sacrifices for our brethren, let us never regard it as a loss; but rather consider it as an honour that we have been capable of labouring with more zeal and success than others. Let the base principles of selfishness never find a place in our hearts; they who endeavour to enrich themselves at the expense of another, and to appropriate unto themselves alone the treasures of their country, are despicable members of society, who have forfeited their dignity, and sunk beneath the level of brutes. Whenever we are in any degree able to contribute to the general good, let not the uncertainty of being

rewarded prevent our exertions; the testimony of a good conscience and the blessings of eternity, will sufficiently repay us.

It is too true, however, that one of the greatest evils of life is the want of harmony and concord among the individuals of the human race. Even in this we may admire the wisdom of God, who notwithstanding the want of union, and the disorders which reign in the world, notwithstanding the universal self-interest which governs men, still supports society and renders it flourishing. When a careful pilot steers his vessel in safety amidst the shoals and the rocks against which the waves strive to dash him, we admire his skill and experience; so when we see, in spite of the wickedness of men, in the midst of the storms and ebullitions of their passions, the dominion of wisdom and the preservation of virtue, we may admire and reverence the eternal wisdom of Him who governs the universe.

MAY XXX.

PRODIGIOUS NUMBER OF PLANTS UPON THE EARTH.

More than twenty thousand different species of plants have been already observed, and new ones are daily discovered. By means of the microscope some have been found where they were least expected. The different variety of mosses and sponges have been classed among vegetables, and have presented to the observation of the naturalist seeds and flowers before unknown. Freestone is sometimes covered with brown and blackish spots; the mouldy substance which composes them adheres to various other matters, and may be considered as a little garden in vegetation, where the plants, though exceedingly minute, have visible seeds and flowers. When we reflect upon the quantity of moss which covers even the hardest stones, the trunks of trees, and the most barren places; when we consider the quantity of vegetables upon the surface of the earth; the different species of flowers which delight and refresh us; the trees and bushes; add to these the aquatic plants, some of which exceed a hair in fineness; we may be able to form some idea of the multitude of plants in the vegetable kingdom.

All these species grow up and are preserved without detriment to one another, each having a place assigned it which is most suited to its properties. Such is the wisdom displayed in their distribution over the surface of the earth, that there is no part of it wholly destitute, and no part enjoys them in too great abundance. Some plants require the open field, where, unsheltered by trees, they may receive the sun's rays; others can only exist in water; some grow in the sand; others in marshes and fens, which are frequently covered with water; and some bud on the surface of the earth, whilst others unfold themselves in its bosom.

The different strata which compose the soil of the earth, as sand

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clay, chalk, &c. have each their different vegetables; and hence it is that in the vast garden of nature nothing is absolutely sterile; from the finest sand to the flinty rock, from the torrid to the frozen zone, each soil and climate supports plants peculiar to itself.

Another circumstance highly worthy of attention is, the Creator has so ordered, that, among this immense variety of plants, those which are most proper for food or medicine, either to man or beast, grow in greater abundance than those which are of less utility. Herbs are much more numerous than trees and brambles; grass is in greater abundance than oaks; and cherry-trees more plentiful than apricots: had oaks been more frequent than grass, or trees than herbs and roots, it would have been impossible for animals to subsist. Almighty and merciful God, here also we have to acknowledge the wonders of thy Providence! Thy goodness is every where manifested, and there is no mind so weak that does not comprehend that Thou art all-great, all-powerful, and good! to be convinced of this we have only to contemplate the widely extended vegetable kingdom. Wherever we go at this season of the year, we walk on plants and flowers; and as far as we can extend our view we behold fields and meadows, covered with the rich blessings of heaven!

MAY XXXI.

PLURALITY OF WORLDS.

Pride, ignorance, or self-love, induce some people to believe that our world is the only part of the immense universe which is inhabited; that the sun is only formed to give us his light and heat; and that the moon and the stars answer no other purpose than to enlighten the gloom of our nights, and serve as guides to the mariner and the traveller. The contemplation of the fixed stars alone is sufficient to refute this absurd opinion. Their brilliancy demonstrates that they shine by their own light; and from their being visible to us notwithstanding their immense distance, we are justified in supposing them to be much larger than our sun. And is it consonant with divine wisdom, which has not created a single particle of matter in vain, that these immense bodies, each in itself a sun, so numerous and so distant from our earth, should shine with ineffectual light, and not be destined to some great and noble end?

If they were merely intended to serve as nocturnal lights to our world they could be of no use during the greatest part of the year. The clouded atmosphere which often envelopes us, and the short nights of summer, which are sufficiently light without the aid of stars, would render them useless; and those stars, of which there are many which we cannot see with the naked eye, because of their vast distance, would exist in vain: and their supposed destination would be much better accomplished by one single star placed nearer

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ta, than by millions so distantly situated that their rays could not reach us. The same kind of reasoning will hold for whatever use we imagine the stars to be created; whether for the purposes of navigation, or any other use, we shall fall equally short of the truth, and must ultimately be brought to confess that if no creatures beyond our globe profited by their light and heat, or if they themselves were not inhabited by living beings, their creation would be useless, and their existence superfluous: but the Almighty has created nothing that is not pregnant with utility; and if we can discover nothing, however insignificant, on this earth that does not answer some end, how much more must these immense bodies tend to manifest the power and glory of God!

This conclusion will appear still more just if we reflect attentively upon the solar system. We have seen in a former discourse that the moon in many respects resembles our earth; and from all that we have been able to discover of her, we have reason to believe she contains inhabitants. The analogy between the moon and the planets leads us to suppose they also are inhabited; and, as each fixed star has, according to all appearance, like our sun, its particular planets, so we may reasonably suppose they in some degree resemble the planets in our system: and thus we see around us an innumerable multitude of worlds, each having its peculiar arrangement, laws, productions, and inhabitants.

How infinite are the works of God! How majestic the starry heavens! and how great must be their Creator, whose glory millions of worlds declare, and whose all-intelligent power the myriads which inhabit them, adoring, acknowledge! Let us unite in the heavenly choir, that whilst incense from millions of worlds is ascending unto the God of all power, we alone may not be wanting in the universal song of joy, of praise, and of thanksgiving, to the great God of all, the Father of light and glory. How grandly does the prospect of futurity open upon our souls, when we shall become acquainted with the worlds whose existence we can now barely ascertain, and the least of whose wonders we are unable to comprehend! when we shall be initiated into all the mysteries of heaven, and admitted within the circle of that glory whose radiance emanates from the Creator!

A HYMN OF THANKSGIVING.

Celebrate the praises of the Lord, and adore him. Exalt, praise, and sing the marvellous and wonderful works of your Creator, all ye whom he has made capable of enjoying them! For great is his power who has created the heaven and all its hosts, whose beauty and splendour announce the glory of the Parent of light and life; the universe declares it, and the eye is never weary with contemplating that in which it continually discovers new beauties. But the

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eye alone does not enjoy these pleasures; the beauties of nature speak to the soul, and fill it with rapture.

O man, is there a blade of grass, a leaf, or a grain of dust, which does not proclaim to thee the council of the strong God? How rich is He in power and beneficence! but, alas! how often does He find thee insensible; thy heart is hardened, and thine eye turns away from his works! Yet for thee His creative hand has diffused life and beauty through all things; for thee He has created, preserved, and adorned so many different beings which thou beholdest in the garden of nature.

Thy God has need of nothing: it is for thy happiness that he has diversified the creation with so many charms, and that he has endued thee with an intelligent, immortal soul. Why then wilt thou seek happiness in that which is false and deceitful? Turn thine eye to thy God; from him thou wilt derive true felicity: enjoy the blessings which he gives thee, and repentance will never follow the enjoyment.

JUNE I.

DIFFERENCE BETWEEN THE WORKS OF NATURE AND OF ART.

When we compare the works of nature with those of art, we find that the former infinitely surpass the latter. And when we consider that the works of art are merely imitations from nature, there can be no doubt entertained on the subject. The nearer an artist approaches to nature the more perfect is his work; he can invent nothing that is new, and his most sanguine hopes are to imitate nature, which is rich and various, whilst the variety of art is soon at an end, and her resources quickly exhausted. The kingdom of nature is almost unlimited; we may every where find treasures inexhaustible, and stores without end; her minutest objects are worthy of observation; and whether we examine a stone, a plant, or an animal, we shall find that they contain beauties which captivate, and perfections which astonish. The works of art, on the contrary, are soon exhausted: if we scrutinize them with the eye of critical nicety, we discover faults which we did not expect, and imperfections which we did not imagine; our admiration ceases, and we turn from them without delight.

The works of art, and the proudest monuments of human skill, are mouldering in the dust, while those of nature continue in the vigour of youth and the freshness of beauty. The advantage of the latter in structure, over the former, is not less evident; whoever compares the mechanism of the most ingenious machine with that of animals, will be amazed with the one, whilst he considers the other as a mere bauble, or toy. To take the human body as an example: how wonderfully is it organized! The perfect and regular structure

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of the muscles, each one admirably adapted to its particular use; the circulation of the blood; the complicated variety of motions; the symmetry of the limbs, and the diversity of the functions; all display the most abundant proofs of the works of an Artificer, in comparison of which those of man are of less account than the dust in the balance.

It would be useless to weary the reader with more observations to prove a self-evident fact: for, though such is the depravity of human nature, that our self-love induces us to prefer our own productions to those of another; and the taste of some men is so vitiated that they are disposed to disregard, and consider with indifference, whatever is not produced by human industry and human ingenuity; few would be found so hardy as to expose their folly, and evince their total destitution of feeling, by asserting the puny efforts of art to be superior to the rolling of the billows, the cloud-capt mountains, and the smiling verdure of the valleys, together with all those stupendous and beautiful works that the ever-varying face of nature continually presents, the study of which yields delight and joy ineffable. Whilst it expands the mind, it renders the heart susceptible of all those feelings which raise the dignity of human nature, and advance it nearer to that Being who is the Source of all mercy and goodness; whom the more we contemplate the more we desire to imitate; and the more we imitate the more fitted we become for the blessed realms of peace, and the practice of every virtue.

JUNE II.

LEAVES OF TREES

Leaves, the ornament of trees, are one of the chief beauties of nature. Our impatience to see them bud in the spring, and our joy when they appear, sufficiently declare how much we consider them the pride of our gardens, fields, and woods. What a grateful shade they form in the hot days of summer, when, retreating from the fervent rays of the sun, we repose on the bank of some clear stream beneath the overhanging trees! Yet this is the least of the advantages which the leaves of trees afford. We have only to consider their wonderful structure, to be convinced that they are formed to answer much more important purposes. Each leaf has certain vessels, which, being closely compressed at the extremity of the stalk, extend themselves like ribs on the interior part of the leaf, and ramify in various directions; and every leaf contains also an astonishing number of pores. In one species of box, called Palma Cereris, one hundred and seventy-two thousand pores have been enumerated on one side of the leaf. In the open air the leaves turn their upper surface towards the sky; and the under towards the earth, or the interior part of the plant. To what purpose could this particular arrangement conduce,

if leaves had no other use than that of ornamenting trees, and affording an agreeable shade? Surely the Creator had something more important in view.

Leaves are instrumental to the nutrition of plants, by imbibing through their pores the humidity of the atmosphere, which they communicate to the whole plant. How admirable is the wisdom of their organization! By its means, plants in dry seasons do not run the hazard of being deprived of moisture; they receive a plentiful supply of refreshing dew, which, falling upon the upper leaves, drops from them upon the lower ones, so that all receive a portion, and none of the invigorating juice is lost. It appears from various experiments, that plants perspire to a considerable amount, and the leaves have been ascertained to be the chief organs of this function. They also contribute to introduce into the interior of the plant the air of which it is in want, as well as to extricate that which it has used; and they tend to the preservation of the buds which are to bloom the following year; hence many trees, when stripped of their leaves, wither and die. This frequently happens to the mulberry-tree, whose leaves are taken to feed silk-worms; and this is the reason why the grapes never arrive at maturity, when the vine has been stripped of its leaves in summer.

We may make another remark upon this subject, which throws some light on the manner in which plants acquire their gradual growth. The interior surface of leaves, which is turned towards the earth, is always of a paler colour and less shining appearance, and is more rough and spongy than the upper surface. This peculiarity enables it more effectually to imbibe the dew which exhales from the earth, and to distribute it with more facility and abundance to the whole plant. The leaves turn to that part whence they receive the most nourishment; hence we observe the leaves of certain plants hang very low. The leaves of trees which grow on a steep mountain take a perpendicular direction, by which they are able to acquire the necessary degree of humidity.

We have here fresh cause to admire the supreme wisdom of God, and we may henceforth consider the leaves of trees in another point of view. When we were ignorant of their structure, and of the important ends that they answered, it was not extraordinary that we saw them with indifference. But now that we know each leaf displays evident marks of Divine Power, and is an organ of fertility, it will be impossible to view them again with inattention or disregard; and whenever we see them we shall acknowledge that every thing, even the least object of nature, has been arranged by the wisdom of the Creator.*

* From the experiments of certain chemists it appears, that, during the day, the leaves of plants absorb carbonic acid gas, which is necessary for the nutrition and growth of plants, and they exhale moisture and oxygen gas; it is farther proved by Senebier, that the oxygen gas emitted by the leaves of plants depends on the presence of carbonic acid gas, which the leaves first absorb and afterwards decompose, and then give out the oxygen while they retain the carbon; these operations require the influence of light, which also is essential to the green colour of plants, for when they vegetate in the dark they

JUNE III.

VIVIFYING POWER OF THE SUN.

When first the sun awakens the morn, joy and serenity are diffused over the soul. The heat and brilliancy of the great luminary of day communicate to man the cheerfulness and activity by which he is enabled to fulfil the various duties of his vocation, and enjoy the endearments of social life. The indolence and mental depression which often during the winter rendered us incapable of action, are now dissipated; we feel more pleasure in our existence, and perform our duties with greater ease and comfort. How could it be otherwise, when we witness the universal joy that the sun communicates to the world, and when we see every thing around us affected by his all-vivifying rays? He animates every creature, and rejoices them by his genial influence; millions of brilliant insects awaken and sport in his rays; the birds tune their music to his praises, and every thing which breathes rejoices at his appearance. Every where the joyful effects of his influence are felt: he causes the sap to rise in trees, plants, and vegetables; he unfolds the young leaves, and gives to the flowers their sweet charms; he forms the fruits, gives them their beautiful hue, and hastens their maturity. He diffuses light and life throughout the creation, and without him all nature would languish and die.

The influence of the sun is not only manifest upon the surface of the globe; it reaches the depths of caverns, penetrates mountains, is felt within the ocean, and produces various and important changes on animals, plants, and minerals, whether above or beneath the surface of the earth.

When we consider these salutary effects of the sun, it is natural to reflect upon the miserable state in which we should be if deprived of his light and heat. Without him our earth would be a sterile and lifeless mass, void of order or beauty: the trees could not unfold their leaves, nor the plants their flowers; the meadows would languish without verdure, and the fields without harvests; and all nature would present one wild aspect of sterile deformity. Such was the state of the moral world before the vivifying power of Christ diffused life and consolation over the hearts of men, and, by the purity and force of his light, dispelled the gloom of ignorance, and the shade of mental darkness, that held in bondage the soul.

The sun's vivifying rays emanating from him in all directions, may be considered as an emblem of the happy influence of a truly good man, who scatters joy and blessings on all around him. He strength-

are entirely white. During the night, leaves perform quite opposite functions; for they then absorb moisture and oxygen gas, and emit carbonic acid gas. Another very important function of leaves, is the power they have of converting the sap into a different fluid; it is completely ascertained, that the sap ascends to the leaves, where it undergoes certain changes, and there becomes a fluid, which is instrumental in forming the different parts of plants, as the chyle converted into blood is in forming those of animals.—E.

eneth the weak, cheereth the afflicted, instructeth the ignorant, and relieveth the poor. Such a being is a noble example of what virtue and human nature is capable; and may we each, according to our station and degree, endeavour to imitate such a character with full purpose of heart: it is in the power of each individual to become better; and the longer we refrain from iniquity, the more easy is the path to virtue. Let us each labour for our mutual improvement, and impart to those who are in want a portion of the blessings which we are favoured to receive: our days will then glide on imperceptibly; our hearts, estranged from every sordid care and base passion, will be the seat of love, of peace, and of joyful harmony; and when our last hour shall arrive, we shall calmly repose in humble confidence on the bosom of our God, amid the prayers and blessings of thousands of our fellow-creatures.

JUNE IV.

DESIRES OF THE SOUL UNLIMITED.

Let us employ a few moments in reflecting on our own particular state; and certainly the consideration of our immortal soul has the first claim to our attention, as more nearly concerning us than any thing this world can afford. Whatever satisfaction we may feel in contemplating the objects of the material world, is infinitely short of that which we derive from meditating upon the nature and faculties of the soul. The contemplation of external objects which the traveller meets with on his way is doubtless highly pleasing, because he requires recreation and amusements in his pilgrimage: but by the contemplation of spiritual objects we are led to the consideration of the immortality of the soul, and the endless felicity of the righteous in the world to come. Let us often reflect upon the desires which are impressed on our souls. Experience convinces us that our desire for knowledge can never be satisfied; as soon as we have made one discovery, we thirst after more information, and, in proportion as our ignorance diminishes, we wish for more knowledge. Our desires are insatiate, and when we at length enjoy what we most ardently longed for, new wishes spring up, and the desire of receiving additional blessings accompanies us from infancy to the grave.

From all this we may infer, that, as no external object gratifies us long, as our desires never end with enjoyment, and nothing present is entirely satisfactory, but that we are continually looking for future blessings without ever being fully gratified, there is a state of existence beyond the present, the desire of which is so strongly implanted in our souls, that nothing short of it completely satisfies us. Can any one suppose that man should be the only creature upon the earth which possessed a faculty, without the power of obtaining the end for which that faculty was given him? or that man alone should

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possess an instinct whose instigations he could not satisfy? This, indeed, would render his condition more pitiable than that of the brutes; for when an animal of that description is hungry or thirsty, it finds aliment to supply its wants: we see the silk-worm spin its cone, and shut itself up within it till it comes forth a new creature; and we see birds lay eggs; but would these things happen if it were not designed for the preservation of their species? If then our existence was limited to the short span of this present life, why are implanted in our souls desires boundless as infinitude, and inclinations which nothing earthly can gratify? And why have we faculties which are ever grasping at something beyond their reach? Surely the great Author of nature has never given us such desires without some wise and noble end, much less has he endowed us with them that they may be our tormentors.

Gracious God! my soul feels Thy sweet influence, and loves Thee above all other things.. It aspires to imitate thy perfection, and unites itself unto Thee for ever; it can soar above all terrestrial objects, and continue its lofty flight till it reaches Thy throne. And can this soul, this principle of power and intelligence, the emanation of the Deity, ever be annihilated? Were that the case, vain would be our knowledge, and fruitless our love of God. For the utmost stretch of human attainment is very little; the highest degree of perfection which man can possibly acquire is very inferior, and infinitely short of what he conceives. Doubtless, then, all the excellence which we are permitted to possess upon the earth, and all the intelligence which we are enabled to attain, are but the forerunners of that endless felicity, the hope of which cheers every heart.

From these considerations we may learn something of our future destination. We now see that the desire of increasing in wisdom and virtue, and the wish of always approximating nearer to God, the Source of all perfection, are not accidental, or given us in vain; we now know, that the happiness which our imagination could anticipate but not enjoy in this state of being, will be the endless reward of the just; and we are now convinced, that those favoured moments in which the love of God warmed our hearts, when all the blessings of heaven opened before our view, and when we so ardently longed after perfection, were not useless nor without efficacy. We are continually advancing towards perfection; and the more earnest and unremitting are our endeavours, the nearer shall we attain to it; no faculties of the soul are useless, and the more they are exercised the greater will be their powers. Let us then rejoice in our immortality, and ascend from what is visible to what is invisible. Let us in the midst of pleasure, when surrounded with all that this world can afford, when animated by hope, and in the enjoyment of every blessing which the most favoured children of humanity are permitted to receive, lift up our souls to heaven, and reflect upon the purity of God, that we may be preserved from the allurements of sense, and not debase our faculties by pursuits beneath the dignity of human nature, and incompatible with the sacred duties of Christianity.

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JUNE V.

UTILITY OF RIVERS.

When we calculate the space which our rivers occupy, we find that it takes up a considerable part of the earth. Let those who are discontented with this arrangement, and imagine that it would be more beneficial if the rivers had been fewer and the land more abundant, consider with what wisdom and beautiful proportion the Creator has formed the globe, and they will then doubtless be ready to acknowledge that the rivers have not been distributed upon the earth without the wisest views, and an evident utility to man, and every living creature.

First, we may observe, that river-water supplies a very wholesome beverage. Spring or pump water, when it has remained long under the earth without agitation, detaches and dissolves, or holds suspended, particles of matter which may be injurious to our system; but river-water, which is continually evaporating, and constantly undergoing agitation, refines itself from all impurities, and becomes the most salubrious drink for men and beasts.

This is far from being the only use of rivers; do we not owe to them the neatness, salubrity, and comfort of our dwellings, as well as the fertility of our fields? Our habitations are always unhealthy when surrounded by marshes and stagnant waters, or when a drought is produced in consequence of the want of water. The smallest river is refreshing, and cools the air; whilst the earth is rendered more fertile. What an astonishing difference is observed between a country watered by various streams, and one to which nature has denied this blessing! The one is dry, barren, and desert; the other flourishes like a garden, where woods, valleys, meadows, and fields, present every variety of beauty. A river meandering through a country, carries with it refreshment, abundance, and prosperity; and not only irrigates the roots of plants, but fertilizes the earth by frequent inundations and continual evaporation.

Surely then no one can be so inattentive and ungrateful as not to acknowledge the advantage of rivers, seeing that they are the source of such numerous blessings. If, by means of rivers, merchandise could not be floated through every part of a kingdom, commerce would be impeded; without their assistance the machinery of numerous manufactories would be stopped, agriculture would suffer, and the tables of the luxurious would be deprived of many of their delicacies The only inconvenience of rivers is their being sometimes subject to inundations, which occasion very considerable damage: but this, compared with their many advantages, is trifling; inundations do not happen very often; they seldom extend far; and whatever temporary losses they may occasion, they amply indemnify by enriching and fertilizing the land. Thus the consideration of rivers will convince the attentive observer, that the divine goodness is manifested through

all nature, in the ocean, and in the rivers of water, equally as upon the solid earth. We find every thing conduces to our happiness and advantage; and if we were deprived of any one of the blessings we now enjoy, part of our comfort and felicity would be taken away.

JUNE VI.

DIVERSITY OF FLOWERS.

When we consider the prodigious number of flowers produced in the spring, summer, and autumn, we cannot but be astonished; and their variety is not less remarkable: to produce so great a number required the agency of a divine power, and to effect such a diversity demanded that power to be exercised with a wisdom equally admirable. If they bore an exact resemblance to each other in their structure, form, dimension, and colours, we should be wearied with their uniform sameness; if the summer produced no other plants and flowers than such as we had already enjoyed in the spring, we should soon be tired of viewing them, and we should neglect their culture.

It may therefore be regarded as a proof of the divine goodness, that the productions of the vegetable kingdom are so pleasingly diversified, and that such a variety of new charms is continually added to their perfections. This diversity not only takes in the different classes and genera of plants, but may be observed in each individual: thus, the genus of the carnation differs in appearance from that of the rose, the rose from the tulip, and the tulip from the auricula; and each individual rose, tulip, or carnation, has its peculiar character displayed in its structure, size, or beauty—we can scarcely select two flowers that are precisely similar in every respect, each one having peculiar beauties, though both are individuals of the same plant.

If we examine a flower-bed, we shall find some of the flowers of an extraordinary height, towering above the rest; others are of a middling size; and some just raise their heads above the earth. Some have the richest and most brilliant colours; others are more simple and plain: some perfume the air with the most exquisite fragrance; whilst others only please by the beauty of their tints or the delicacy of their form. The variations in flowers are not less remarkable in the different seasons of the year: thus, in spring, when men leave the close confinement of towns to enjoy the charms of the country, the blossoms are seen in full bloom and beauty; as summer advances thousands of flowers offer themselves to the admiring spectator, and one species succeeds another in a regular and defined order. When at length winter arrives, it brings with it other plants which, though they may not be so pleasing to the eye, are not the less useful. Among vegetables there is still more variety. What a diversity, and how many links are observed, between the weeds which grow

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among stones, and the blade of corn! In plants whose nature it is to creep, what a difference between the ivy, which clings to the mouldering monuments of magnificence, and the succulent vine, whose grapes refresh us as fruit, and invigorate us as a beverage!

Thus every thing is planted in wisdom and produced in perfection; every where the useful blends with the agreeable, and the infinite goodness of God is manifested throughout the creation.

JUNE VII.

USE OF VENOMOUS ANIMALS AND PLANTS.

Every production of the earth, considered separately, is good and wholesome: and if any thing is found to be noxious, it is because we do not make a proper use of it. Hence it is, that the food which preserves the life of one animal, occasions the death of another; and the same plant which in certain circumstances is regarded as poisonous, in others is highly useful and salutary. Hemlock, for example, was formerly considered a deadly poison; but it is now employed in many cases as a medicine with considerable success, and without producing any bad consequences. The number and variety of vegetables growing upon the earth is prodigious; we must not, however, imagine they were all created for the use of man; some are designed for beasts, some to exhale grateful odours, and others are useful in many of the diseases to which the animal economy is subjected.

The same thing holds good with regard to many living creatures, which, though very dangerous to man, are useful to other animals, as affording food or medicaments. Many birds feed upon insects which are considered as noxious; domestic fowls are fond of spiders; peacocks and storks will feed upon serpents. Some of the most efficacious medicines are composed of the most poisonous herbs. The number of plants and animals of a poisonous or venomous nature is very inconsiderable, compared with those which are evidently useful and beneficial; and both men and animals have a natural repugnance and aversion for every thing which is hurtful or prejudicial to their nature. Mischievous animals have a certain dread of man, which prevents their attacking him unless they are excited to it by provocation or necessity; and the most hurtful species of animals have generally some distinguishing characteristics by which their dangerous properties may be known and guarded against. The rattle-snake, the most dangerous of serpents, makes known his approach by the rattling noise of his tail. The crocodile is so clumsy in his motions, and turns round with so much difficulty, that it is easy to escape from him. Divine goodness, moreover, has so ordered, that the most dangerous and venomous animals furnish the antidote for their own poison: thus, the oil procured from a scorpion is an infallible remedy against its sting; a bee, bruised and rubbed on the part it

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has stung, assuages the pain; and the fat of vipers is an excellent remedy for their bite.

Perhaps it will be urged that it would be better if no plant or animal had been created with the power of injuring living creatures. Such a suggestion can arise only from ignorance; for, if the Author of nature has formed creatures with the power of injuring one another, it is for the wisest purposes, and from such an arrangement many advantages result. Several creatures which appear to be noxious, are only so in certain respects; their poison, and the organs which enable them to inflict wounds, are absolutely necessary. One illustration of this will be sufficient for our present purpose; the bee often causes very great pain by his sting, but deprive him of that, and he is useless; and so it is throughout the unlimited field of nature, that which appears to be noxious is indispensably useful. Why then has man the presumption to determine upon what is useful or prejudicial in nature? or who can assert that it is contrary to the wisdom of God that we should suffer pain? Do not the most unpleasant things often procure us the greatest advantages? In general it will be found that natural things are only accidentally hurtful; and if we ever receive any injury from them, we may almost always attribute it to our own imprudence and neglect.

JUNE VIII.

ODOUR OF FLOWERS.

A profusion of beautiful objects every where surrounds us; every thing that we see and hear, all the sensations of smell and taste, contribute to our delights and multiply our gratifications. All nature seems to combine in these happy days to fill our souls with rapture, and raise our hearts to the Deity, from whom flows every joy, and of whose goodness every flower is a consoling proof.

At present, let us confine our attention to the pleasure we derive from the agreeable and varied fragrance of flowers. The goodness of God would have been amply displayed in the creation of flowers alone, which so much delight by their beautiful variety; but he has done more, he has given to the fairest of nature's productions the most grateful fragrance. The scents of flowers are not less exquisite and various than their different shades of colouring; and though it is not easy to determine in what this difference of odour consists, it is very perceptible upon passing from one flower to another. It may be also observed, that their smell is neither potent enough to affect the head, nor so weak as to prevent its pleasing influence. The particles which are continually exhaling from flowers are so light and subtile, that they are easily wafted to a great distance: the perfume which arises from a single grain of amber will scent a very large room; and

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the smell of the rosemary growing in Provence is perceptible at sea at the distance of twenty miles.

The cause of these exhalations so readily affecting the organs of smell must be attributed to the structure of the nose, which is composed of a cavity formed by bones and cartilages, and is separated into two cavities called nostrils, by a partition, the upper part of which is bony, the lower cartilaginous; the superior part of this cavity communicates with the mouth, and it is lined with a membrane upon which is a very fine expansion of nerves, proceeding from the brain through the os cribriforme or sieve-like bone, so called from its numerous perforations. The odours floating in the air are readily received into the nostrils, and impress the exquisitely sensible membrane with the sensation of smell.

In this structure we may particularly remark the wisdom of the Creator displayed in the formation of the bony plates which terminate the upper part of the nose, and have a twofold use: they prevent injurious substances from entering the passages of respiration whilst we sleep, or are incapable of guarding against them; and they receive the ramifications of the olfactory nerves, numerous branches and filaments of which are dispersed over these lamina, and thus receive the odoriferous particles which enter the nose along with the air. Let us then rejoice and be thankful for this most gracious gift of our heavenly Father; a gift which procures us the most delightful sensations, and without which nature would lose half her charms. In our walks through the garden, whilst we are gratified with the fragrance of a thousand flowers, let us lift up our hearts in gratitude to that Being who has graciously bestowed upon us these sweet productions of nature.

JUNE IX.

MULTITUDE OF ANIMALS.

Naturalists have calculated that the number of animals upon our globe amounts to about four hundred thousand species. It is supposed, that in the known parts of the earth there are more than four hundred and fifty species of land animals; of birds, six hundred; of fish with scales, two thousand; of shell-fish, three thousand; and of insects distinguishable by the naked eye, upwards of twenty thousand species; besides those which belong to different kinds of animals, amounting to near one hundred thousand species. And there are immense tribes of insects entirely unknown to us, the number of which may be estimated at two hundred thousand. We must also take account of those which live upon plants; and eighteen thousand varieties of plants having already been described, if we only allow each to contain four species of insects, the number of these will amount to seventy-two thousand.

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This estimate of the number of animals living on our globe, will doubtless appear prodigious; but if we believe with some naturalists that the whole kingdom of nature is every where animated, and filled with living beings, we shall not find it too great. Some physicians have maintained that the diseases which are accompanied with eruptions and pustules, as well as some species of fever, are occasioned by little insects; and it is probable that the atmosphere is sometimes peopled with insects, though their extreme minuteness renders it impossible to detect their presence. If we examine any flower, as a rose or a daisy, we shall discover a multitude of insects, and the smallest portion of the earth teems with life; animals are even contained in each other. The air, the juices of plants and animals, putrid substances, excrementitious matter, smoke, dry wood, and even the hardest stones, serve as habitations for living creatures.

The sea also seems to be an element composed of animals. The light which is sometimes observed upon it in a summer night, is owing to a multitude of small luminous worms, the particles of which, detached from the body and become putrid, float on the water, and continue to shine as when the animal was alive. Innumerable animalculæ sport in the rays of the sun; and all these little beings are infinitely diversified in their figure, organs, and motions. Such is the number and variety of the beings which inhabit this globe. Let us attempt to name all these animals, to enumerate only the individuals of a single species; or endeavour to calculate the number of herrings, flies, worms, birds, &c. and we shall find ourselves utterly unable to perform what it would be impossible to express by numbers.

Here we have abundant cause to admire the infinite power of the Creator, who alone has produced all these creatures, and who still continues to support and to preserve them. Consider the food these various tribes of animals require; if they only lived by destroying one another, nature would every where present scenes of cruelty and slaughter. But fortunately, the number of carnivorous animals is few, and these are useful in devouring the carcasses that, lying about and becoming putrid, would infect the air. The vegetable kingdom, however, is more properly designed for the nourishment of animals; and almost every species has some particular kind of plant which it makes choice of: and that every species of animals may have food proportionate to their nature, they are distributed in different countries of the earth. And how beautiful is the arrangement of nature! One tree is larger than many thousand plants, and yet it occupies only the space of a few feet in the earth; and many animals, birds, and insects, find in it their abode and nutriment.

How merciful are the cares of Providence for animals, in surrounding them with a fluid suited to their respective natures! And will the atheist dare to say that there is no God! Senseless man! 'Go and ask of the beasts, and they will teach thee; of the fowls of the air, and they will tell thee: speak to the reptiles of the earth, and they will inform thee; unto the fishes of the sea, and they will declare unto thee the ways of the everlasting God. Who knoweth not

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in all these that the hand of the Lord hath wrought this? In whose hand is the soul of every living thing, and the breath of all mankind.'

JUNE X.

IMMENSITY OF THE FIRMAMENT.

Approach, O man! and contemplate the firmament: regard those vast bodies which nightly illumine the heavens; endeavour to count them, and thy sight will be confused, whilst thine eyes survey the infinite multitude of stars. Call to thy assistance the powers of the telescope, and millions of new worlds will present themselves to thy view. Continue thy observations, and attempt to number these luminaries; thy ideas will be confounded, and thou wilt be convinced that no known numbers can express the multitude of all the stars which bespangle the firmament.

It is true, that at a very early period men began to turn their attention to the stars, and to ascertain their numbers; but since the invention of telescopes new discoveries have proved the imperfection of former calculations, and shown the difficulty, if not impossibility, of our gaining a certain knowledge of this important subject. To count the stars seems to be an enterprise as impracticable as that of numbering the grains of sand on the sea-shore.

The invention of telescopes has enabled us to obtain much more information than we otherwise could have done; but the most exact observations made through their means tend to convince us that our powers are too limited to discover all the heavenly bodies. One of the most ancient astronomers enumerated only one thousand and twenty-six stars, and his catalogue was afterward increased to one thousand and eighty-eight. The number is now considerably augmented: by means of instruments, we learn that the long and luminous tract seen in the heavens, and called the Milky Way, is composed of innumerable stars; and we also know that where but a single star was formerly seen, by the assistance of a telescope we now discover many, and two constellations alone display more stars than were before observed in the whole heavens.

Such considerations as these enlarge our ideas of the universe. And if our admiration of the immensity of the divine power be increased by these discoveries, how much greater will it be, when we consider the magnitude of those stars, which, notwithstanding their prodigious distance, are perceptible by the naked eye. The most exact and indubitable calculations inform us, that a cannon-ball, shot off from the nearest fixed star, would fly seven hundred thousand years before it reached our globe.*

* The distance from us to the nearest fixed star is computed at 32,000,000,000,000 of miles, being farther than a cannon-ball would fly in seven millions of years.—Ed.

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Some of these globes, being nearer to us, appear larger than the rest, and are on that account called stars of the first magnitude; the next to these are called stars of the second magnitude, because being at a greater distance, their magnitude appears less. The next to them in lustre are of the third magnitude, and so on to the sixth, the smallest visible to the naked eye.

Creator of heaven, and sovereign Ruler of worlds! Father of angels and of men! how my soul loves to stretch forth her pinions, and wing her imaginary flight beyond the confines of mortality, unto the regions of day; where for a space forgetting the cares and vexations of an anxious existence, she contemplates with rapture Thee, the Author of light, and wishes that her faculties were vast as the extent of heaven, and unlimited as the regions of space, that she might comprehend Thy sublimity, and raise her thoughts from those innumerable worlds, the offspring of Thy power, unto Thee, the sanctuary of grace and the source of glory! But whilst we are travelling through life's uncertain path, such desires cannot be realized; we cannot comprehend Infinity; and these aspirations of a noble and exalted soul are obliged to yield to our imperfect nature: but they strongly evince the soul's ethereal essence, and lead us to expect the joyful moment when, delivered from her present bondage, all her faculties will expand, and she will in one instant know what the united intellect of centuries could never discover.

JUNE XI.

PECULIARITIES IN THE VEGETABLE KINGDOM.

The difference between animals and vegetables is so great, that on a superficial view we do not perceive any resemblance between them. Some animals only live in water; others on the earth, or in the air; and some are amphibious, or capable of living either on land or in water. And this is literally the case with vegetables: some of them only grow upon land, others in the water; some can scarce bear any moisture; others either live in earth or water; and some even are found that exist in the air. There is a tree in the island of Japan, which, contrary to the nature of all other trees, to which moisture is necessary, cannot bear wet. As soon as it is watered it perishes; the only way to preserve it in such a case, is to cut it off by the root, which is to be dried in the sun, and afterwards planted in a dry and sandy soil. A peculiar species of mushroom, some mosses, and other small plants, float in the air; but what is still more extraordinary, a bunch of rosemary, which, as is the custom of some countries, was put in the hand of a corpse, sprouted out to the right and left so vigorously, that after a lapse of some years the grave being opened, the face of the defunct was overshaded with rosemary leaves.

The vegetation of the truffle is still more singular: this extraordi-

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nary tubercle has neither roots, stem, leaves, flowers, nor seeds; it derives it nourishment through the pores of its bark. But it may be asked, how is it produced? Why is there commonly no kind of herb in the places where this species of mushroom grows? and why is the land there dry and full of crevices? These things have never been explained.

No plant so much resembles animals as that species of membraneous moss called nostoch: it is an irregular substance of a pale green colour, and somewhat transparent; it trembles upon the slightest touch, and easily breaks. It can only be seen after rain, and is then found in many places, particularly in uncultivated soils and sandy roads.

It exists in all seasons, even in winter; but is never so abundant as after rain in summer. The most remarkable circumstance about it is its speedy growth, being formed almost instantaneously; for sometimes if we walk in the garden in summer, not a trace of it is seen; when a sudden shower of rain falling, if the same place is visited in an hour, the walks are entirely covered with it. The nostoch was long supposed to have descended from the sky; but it is now known to be a leaf, which attracts and imbibes water with great avidity. This leaf, to which no root appears to belong, is in its natural state when impregnated with water; but a strong wind or great heat soon dissipating the water, the leaf contracts, and loses its colour and transparency: hence it appears to grow so suddenly, and to be so miraculously produced by a shower of rain; for when the rain falls upon it in its dried and imperceptible state, it becomes reanimated, and appears a fresh production.

We might readily enlarge the list of plants which bear a resemblance to animals; but there are other peculiarities in vegetables which solicit our attention. The whole atmosphere is pregnant with plants and invisible seeds, and even the largest grains are dispersed by the wind over the earth; and as soon as they are transported to the places proper for them to germinate in, they become plants, and often so little soil is necessary for this purpose, that we can scarcely conceive whence they derive the necessary degree of nourishment. There are plants, and even trees, which take root and grow in the clefts of rocks without any soil whatever.

Vegetation is sometimes very rapid; of which we have instances in mushrooms, and the common cresses, the seed of which, if put into a wet cloth, will be fit for a salad in twenty-four hours. There are plants that exist with scarcely any perceptible vitality. We often see willows, which are not only hollow and decayed within, but their external bark is so much injured that very little of it remains; yet from these seemingly sapless trunks buds sprout in the spring, and they are crowned with leaves and branches. It is truly wonderful that plants should not only imbibe nutriment by their roots, but that their leaves also should assist in this important function, by inspiring air; and an inverted tree will flourish, as well as when in its proper situation, for the branches will grow in the earth and become roots.

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The advanced age that some trees attain to, is also very remarkable. Some apple trees are above a thousand years old; and if we calculate the amount of the annual produce of such a tree for the above space of time, we shall find that a single pippin might supply all Europe with trees and fruit. So extensive is this subject, that to follow it through all its ramifications would lead us on much too far for our present limits. All nature teems with wonders; every thing leads to an infinitely perfect Being, whose power, united to boundless wisdom and goodness, is continually acting for our benefit, and daily giving us fresh cause for gratitude and admiration.

How great and magnificent are Thy works, O Lord! What wonders crowd upon my mind! I view them with rapture, and am lost in the contemplation; they surpass my comprehension; I cannot fathom them. At thy command the grass shoots forth its green blade, and the woods are clothed with verdure; the flowers adorn the fields and beautify the gardens with their glowing colours; the tree lifts its tall head to the clouds, and the mountain cedar declares Thy glory! Wherever I turn my view, new wonders delight me: the meadows, the mountains and the valleys, the rivers, the seas, and all, from the least atom to the distant spheres in the heavens, declare Thy goodness and display Thy glory!

JUNE XII.

MEANS OF HAPPINESS DERIVED FROM NATURE.

We have only to consider the bond and connexion existing between man and all natural productions to be convinced that every thing throughout nature tends to his utility. For though there are many bodies whose use with respect to man we do not readily perceive, it is not reasonable to conclude that we derive no advantage from them. Many things, which in the days of our forefathers were considered as useless, are now regarded as benefits; and we may justly presume that our posterity will discover many things to be useful, of whose nature we are now ignorant. In this we may acknowledge the Divine wisdom, which has concealed from us the true use of many creatures, that we may be more humble by feeling the limits of our knowledge, and that our faculties may be continually exercised and improved by contemplating the works of the creation. Many productions of nature are only indirectly useful; for as some animals serve for nourishment to man, consequently whatever tends to their support must be useful to us. We find that many creatures are conducive to the nourishment of others; small fish are the food of larger; many birds feed on worms and insects; and there are many species which live entirely by prey. Here again the divine wisdom is manifested; for if the produce of the fields formed the sole nourishment of animals, there would not be a sufficiency left for the support of man.

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There are some animals, as those of a venomous nature, which certainly are hurtful to man; and there are some poisons so powerful as instantaneously to kill; on which accounts, many creatures are regarded in a very disadvantageous light; yet, if we consider them more attentively, we shall discover traces of the goodness of God, and have cause to admire his wisdom. Physicians make use of many excellent remedies, in the composition of which are substances of a poisonous nature. And can we suppose that man would be more happy if there were no venomous animals upon the earth? The poison that they bear is in part derived from malignant vapours, which man could not have respired without injury; and, in short, we may say with confidence, that there is nothing upon earth really injurious to him, unless he makes an improper use of it.

But if in the formation of the globe God had our happiness in view, are we not inexcusable in counteracting his gracious designs, by putting obstacles to our own felicity, instead of contributing to promote it by our most earnest endeavours? God's designs towards us are merciful, but we often render them ineffectual by a mode of conduct which necessarily makes us unhappy. Let us henceforth be wiser, and better profit by those various means of happiness with which it has pleased a gracious God to supply us so abundantly in the kingdom of nature; and as our desires are not completely satisfied by any thing this world can afford, let us look up to Heaven, the source of all good, and we shall feel our minds enlarged by the influence of a pure religion, which will teach us things of which we were before ignorant, and point out the true path to endless felicity!

JUNE XIII.

THE MAGNET.

Of all the bodies in the mineral kingdom the magnet, or loadstone, has the most striking properties. It is an iron ore of a dark gray colour, and has the property of attracting iron. This power of attraction resides chiefly in the two extremities of the magnet which are termed its poles; and when it is free and suspended by a string, it constantly directs one pole to the north and the other to the south. This effect is invariably produced, however the stone may be moved, if it is at last left to itself.

This constant and uniform direction of the magnet, which only varies in some particular parts of the globe, has given rise to that extremity of it which points to the south being called the south pole, and the opposite extremity the north pole, of the loadstone. It communicates to iron polarity, and the power of attracting steel. This discovery introduced the magnetic needle, so necessary to navigators; hence we find that many things which at first seemed to be of no importance, may become highly useful to the world; and the more we

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extend our knowledge of nature, and study the magnificence of the creation, the more will our intelligence be amplified, our understanding enlarged, and our means of felicity increased.

These virtues of the magnet induced naturalists to examine it more closely, that they might be enabled to penetrate into the cause of such surprising effects, as well as discover new properties in the stone; in which last endeavour they were more fortunate than in the former. They found that the magnet did not always, nor in all places, point alike to the north; but that it inclines one while towards the east, and at another towards the west: they also remarked, that its attractive power acted as strongly when they interposed any other body between it and the iron. All metals, iron excepted, wood, glass, fire, water, and animal bodies, give a free passage to the magnetic fluid, and do not prevent its acting upon iron. They discovered that the north pole of one magnet attracts the south pole of the other, and that the north pole of one repels the north pole of the other; and the south poles applied together also repel each other. It was supposed that the attractive power resides in the iron as well as in the magnet, since the attraction seems to be mutual. To prove this, we have only to suspend a magnet at one end of the beam of a balance, and attach to the other extremity a weight equal to that of the magnet; when the balance is made perfectly equal, place a piece of iron beneath it, and the magnet, attracted by the iron, will descend. The same thing will happen if the iron is attached to the beam, and the magnet be placed beneath.

However singular these phenomena may appear, there is another circumstance respecting the magnet not less deserving our attention; which is, that all the skill, the sagacity, and efforts, of philosophers, have not succeeded in discovering the cause of these astonishing effects: notwithstanding all their labours the magnet still continues to perplex the learned, and excite the desires of the curious to unravel its mysteries. If then in natural productions there are many things which the human intellect cannot comprehend or explain, how much more must there be in religion, which is elevated so far above all the objects of our senses? There are mysteries, the explanation of which we cannot obtain in this finite state of existence, and the perfect knowledge of which is reserved for a future world. And can it be surprising that there are things in religion beyond the reach of our understanding, when there are natural productions which daily attract our attention, whose properties defy the united powers of the learned to explain? There are, however, men who have the presumption and the folly to doubt, and even to deny, all that they cannot understand of religion. If this was a just method of proceeding, it would be equally rational to doubt or to deny that the magnet attracts iron, or possesses polarity; and to assert that all that is related of it is false; for we cannot explain or comprehend the cause of the effects it produces.

When the existence of natural objects is disputed, we have only to say unto the skeptic, Come and see: but the mysteries of religion

are not so easily penetrated; they are hidden from the foolishly wise, and are revealed unto babes; they are seen only with a spiritual eye, and their perfect comprehension is reserved for a more pure and exalted state of existence. When we meet with difficulties, and things which we cannot comprehend, whether in the ample volume of nature or in the pages of religion, let us not be impatient, but bow with resignation to the will of all-ruling Heaven; remembering, that however confined are our faculties and humble our intellectual attainments in this life, we are graciously favoured to hope and believe that a great portion of our felicity in a future world will be in that expansion of soul by which it will be enabled to know all that is now concealed from it, and approach in its nature nearer to its Almighty Creator.

JUNE XIV.

CHERRIES.

The cherry is a fruit, which, by its sweetness, blended with a pleasing acidity, quenches the thirst, allays the heat of the blood in summer, and prevents many disagreeable effects which a hot season might produce in our system. They quench the thirst, by their sharpness causing the salivary glands to contract, they cool the parched tongue, and moisten the dry palate. This mode of allaying thirst during hot weather is much preferable to drinking a large quantity of liquid, which distends the stomach, and tends to increase the heat and perspiration. Besides the cherries thus pleasantly appeasing our thirst, they possess a cooling property, which tempers the heat of the blood; and thus prevents the debilitating effects of the nerves being continually stimulated. Thus the beneficial juice of cherries, by its acidity and astringent virtue, refreshes us during fervent heats, purifies the blood, and preserves the fluids from putrefaction. How mercifully has the Creator provided us with fruits adapted to each season! During the hot months we require cooling and acid fruits; and we receive them in abundance, both salutary and agreeable, conducing to our nourishment whilst they gratify our taste. We possess them so plentifully, that the poor can enjoy them as well as the rich: let us make this consoling reflection, whenever we see a cherry-tree laden with fruit. How sorrowful would be the fate of the labourer who gains his daily bread with the sweat of his brow, if he had no other means of cooling himself than the delicious beverages which the affluent alone can procure! Merciful Father! Thou art mindful of the indigent; thou providest for his wants and condescendest to refresh him with fruits which thy kind Providence has placed within his reach; and cherries are more wholesome and refreshing to the weary labourer than lemonade and the most sparkling wines to the rich. We have great cause to be thankful for the abundance of acid

and cooling fruits this season affords; gooseberries, currants, cucumbers, stone-fruits, salads, &c. are so many agreeable preservatives of the health.

Whenever we enjoy the sweets of cherries, let us consider them as blessings from heaven, and acknowledge the goodness of our Creator. The heavens, the earth, the elements, and every living creature contribute to our happiness; wherever we turn our eyes they meet the blessings of our heavenly Father, which every where surround us. Animals, corn, vegetables, and fruit, in the valleys and upon the mountains, in the forests and in the seas, all serve for our pleasure and support. The all-beneficent hand of the Most High is continually open to us, and his blessings are for ever showering down from Heaven. When we walk abroad in the fields or in the garden, when we enjoy the beauties and the blessings of nature, let us think of him, the Source of every delight and of every pleasure.

JUNE XV.

WISDOM DISPLAYED IN THE STRUCTURE OF THE BODIES OF ANIMALS.

The formation of the animal body furnishes the most convincing proofs of divine wisdom; for as some animals are designed to live principally in the air, others upon the earth, and others in the water, it was requisite that their structure should be adapted to their particular habitation, and conformable to their peculiar modes of life. And this we find they possess in a most admirable manner: they are each provided with that structure which is most appropriate to their nature; so much so, that any other arrangement would have been inconvenient, if not prejudicial.

Amongst birds, those which live upon prey are provided with strong talons and sharp-hooked beaks, that they may more readily seize and hold their prey. Those which are obliged to seek their nourishment in marshy places require a long slender bill, and long legs; and those which live in water should have the lower parts of their bodies large, a long neck, membranes like webs connecting their claws, enabling them to act as oars, and a kind of oil upon their feathers to render them smooth.

Insects which live upon prey have a mouth formed like pincers or claws, and those which live by suction are provided with a sting or proboscis. The eyes of hares and rabbits are large and project a considerable way from the head, that they may easily discover and avoid the dangers and snares to which they are exposed; and the eyes of the mole are small and sunk deep in the head, because being destined to live chiefly under ground, little light was requisite, and prominent eyes would have much impeded it in the operation of burrowing.

The crystalline humour in the eyes of fish is spherical, to remedy

the inconvenience which would arise from the refraction of the rays of light in an aqueous medium; while animals which live in the air have the crystalline lenticular, or plano-convex. Why have animals whose eyes are moveable only two, whilst those animals whose eyes are fixed have several? Why is the pupil of animals which seek their prey in the night large and brilliant? And why does the eye of the hen answer both the purpose of a telescope and microscope, if not to enable her to see the smallest seeds in the earth and among gravel, and that she may discover at a distance the birds of prey which threaten to seize her young?

How astonishing is that vast assemblage of organs by which animals perform their different motions! What a multitude of limbs! What pliability and activity! What numerous muscles, nerves, bones, and cartilages, every motion puts in action! Some animals move slowly, others swiftly; some have two feet, others more; some have both wings and feet, others neither. The quickness or slowness with which each animal moves is regulated according to its necessities. Those which are well armed, which have courage, force, and skill to defend themselves against their enemies, move more slowly than those which are destitute of these properties. Who has given to serpents and other reptiles the power of contracting and extending their bodies, of coiling themselves into a circle, and of darting upon their prey? Who has so constructed the fish that by means of their bladder they can at pleasure ascend or descend in the water? Who has taught the snail to contract its body, and make water enter into its little habitation when it wishes to fall to the ground?

How skilful is the structure of birds, particularly their wings: and how well their body is adapted for flight! small and sharp before, and gradually increasing till they have acquired their proper size, they readily cut the yielding air, and are less impeded in their passage through that element. The feathers are all arranged with much art, lying one upon another in regular order, by which they facilitate the motion of the body, and at the same time serve it for a covering and a defence against stormy weather and the severity of winter. Though close and strongly joined together, they are capable of extending and erecting themselves; of swelling out and forming a larger volume, according as the necessities of the bird may require. The wings, which are the great instruments of flight, are placed in the most convenient part for keeping the body exactly balanced in so subtile a fluid as the air. How admirable is the construction of each single feather! The quill is stiff and hollow towards the lower extremity, which renders it both light and strong. The beard of feathers is arranged with regularity, broad on one side and narrow on the other; which is particularly useful in the progressive motion of birds, as well as in the strong and close texture of the wings. The feathers are also placed in the most exact proportion, so that each accords with the length and strength of those next to it; and the larger support the smaller. In the bony parts of the wings there are numerous joints which open and shut, or move as necessity requires, whether to extend the wings

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or bring them closer to the body. The pectoral muscles are formed with much strength, to enable the bird to pass through the air with greater rapidity. The tail is so admirably constructed that it serves as a helm to direct the flight, and assist the bird in rising and descending in the air, whilst it keeps the body and wings in a steady position. The legs and feet are equally appropriate to their different motions; in some birds the claws are large, and provided with membranes, which extend and contract to enable them to swim; in others the claws are sharp, and crooked at the points, that they may tread more firmly, perch, seize, and hold their prey; in some the legs are long, that they may walk in the water, and rake up their food from wet and marshy places.

In all this we must see and acknowledge the supreme intelligence of our Creator and merciful Benefactor. Is it possible that things so wonderful, regular, and admirably proportioned, can be the effect of chance! Or can any one be so weak as to imagine it was without design that all this series of vessels, of muscles, of joints, &c. &c. in each animal, were put in motion; and that every part, even the most minute, should bear so strict a relation to others, and all fulfil their different functions with such perfect harmony and regularity? It ought rather to excite in our minds the idea of some great First Cause of all, which is the Creator of the heavens and the earth; whose wisdom and goodness has formed all these creatures, and given them that structure which is best adapted to their nature and situation. Let the presence of these objects then lead us to glorify and adore the Almighty; let us seek for that living wisdom which will teach us more and more of his ways, that we may become better and more intimately acquainted with that Being who has so gloriously manifested himself throughout the creation.

JUNE XVI.

DEW.

The wise Governor of nature, who continually watches over his children, and provides for all their wants, makes use of various means to render the earth fertile. Sometimes he effects this by inundations, which, though they may lay waste the fields, and excite the murmurs of those short-sighted men who only consider present evils, produce in the end the most beneficial consequences to the country in general. Sometimes they proceed from a vast river, which, like the Nile, at stated periods issues from its bed, to water a country and refresh the parched fields, where showers never fall; and at other times they are caused by heavy rains, which descend more or less frequently to cool the air, to moderate the heats of summer, and to irrigate the dry earth. But these means are neither sufficiently constant nor abundant; the most usual, certain, and universal, but that which perhaps

is the least valued and regarded, is the dew. This blessed gift of heaven, which even in years of the greatest drought preserves and supports vegetation, consists in those pure and brilliant drops that every morning and evening are seen collected in considerable quantities upon the leaves of trees and plants.

Dew does not descend from above, from regions more elevated than our atmosphere, as was formerly imagined; neither is it an exhalation from the heavenly bodies, as some have supposed. This pretended celestial origin occasioned that absurd notion of alchymists, which induced them to expect the formation of gold from the drops of dew. At present it is generally understood that dew is nothing more than a vapour, which during the warmth of day exhales from the earth and vegetable productions, and, condensed by the coldness of the night, falls in drops. To be convinced of this, we have merely to cover a plant with a bell-glass, and we shall observe a greater quantity of moisture collected upon its leaves than upon those which are exposed to the open air. This certainly could not happen if the dew descended from above, or if it did not arise from the earth. Nothing is more easy than to account for its formation; for no one can be ignorant that the rays of the sun, and the heat diffused over the surface of the earth, continually cause to exhale from different bodies a multitude of subtile particles, some of which ascend into the atmosphere, and others collect in the form of aqueous drops. This explanation of dew accounts for its being sometimes prejudicial, and at others not so; its nature considerably depends upon the properties of the vapours of which it is composed. The wind carries off the very subtile exhalations as soon as they are extricated, and thus prevents their forming in drops; hence it happens that the dew is most abundant when the air is calm.

By this wise provision of nature, plants are enabled to grow and increase in countries where it never rains; for the soil in those countries being sandy, porous, and very moist beneath, by means of heat, a copious supply of dew is effected, which surrounds the plants, and affords them nutriment. These different means which Divine Providence uses to moisten and fertilize the earth should recall to our minds those which he uses to ameliorate the hearts of men, and render them productive of good works. Chastisements more or less severe, blessings of every kind, exhortations and warnings, by the mouths of his prophets and ministers, with the examples of our fellow-creatures, and a thousand other means, are employed by a gracious God to draw us into his holy communion, to sanctify us, and render us capable of bringing forth the fruits of piety and of virtue. Sometimes a storm gathers, the sluices of heaven are opened, the rivers burst their banks, and the country far round is desolated with the wide sweeping inundation; at other times, God calls forth from the earth the sweet dew, and thus listens in secret to the prayers which the husbandman had uttered for rain. So also he operates in different ways for the salvation of man. To some hardened hearts he speaks in thunder and lightning as formerly from the top of Sinai;

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others he calls unto him, in a voice milder than the evening zephyr, and sweeter than the breath of morning: he awakens their slumbering faculties, and fresheneth their souls with the beneficent dew of his grace.

Let this gracious mercy of God raise in us ardent desires to imitate his heavenly goodness; let us use all our exertions to reclaim the wicked from their evil ways, and direct the steps of those who have strayed into the true path. But let us ever remember the merciful kindness of God, and after his example endeavour to recall the mistaken deluded children of iniquity, by mild persuasion and brotherly entreaties. We see how he refreshes the parched earth by his dew, and gives new life to vegetation. Let us then think upon the number of our fellow-creatures bowed down by affliction, and languishing for want of assistance; and let not their sighs pierce our ears in vain, neither let us turn away from their complaints, nor refuse the tear of sympathy to their misery when we are unable to relieve all their necessities. Let us by our kindness diffuse the cheering rays of consolation into the hearts of those that mourn, and pour blessings upon our fellow-creatures, abundant as the morning dew.

JUNE XVII.

MODE OF LIFE AND LABOURS OF THE BEES.

In these gay and joyful days of summer, every thing in the animal kingdom is in motion, all is full of life and activity; but no creatures are so active for our advantage as the little republic of bees. Of all the insects with which we are acquainted, none are more worthy of our observation, or present us with a more agreeable and profitable spectacle.

Bees generally dwell in great numbers in hollow trees and cavities, or in a kind of basket called a hive, which men have formed to collect them together. They fly abroad, and disperse themselves over the country, and by means of their trunks or probosces extract honey and wax from the juices and stamina of flowers. This they bring to their dwelling, which they fill with hexagonal cells, in some of which they reside; others are destined to receive the eggs and hold their young, and others form the magazines where they deposit the honey which is to support them during the winter.

Amongst all these bees, which together form one large family, there is one greater than the rest, of the female sex, and on that account called the queen. To her alone all the young of one hive owe their existence; from the eggs which she has deposited in the cells little grubs are produced, which the working bees feed for some time with their trunks. These grubs remain in their cells, which are clothed with a covering of wax, for fifteen days, in a state of perfect repose; in this quiescent form they are called nymphæ. When the

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proper time is arrived, they open their cells, and come forth in the shape of young bees. Besides the queen, there are two other species of bees in each hive; the labouring bee and the drone. These latter are males and impregnate the queen, as well as serve her for a guard. Bees have fixed in their heads two antennæ or horns, which defend their eyes and warn them of danger; they have fangs or claws, which they use in their labours, and a trunk or hollow tube, that they can project from, or draw into its sheath at pleasure. This instrument, flexible and moveable in every direction, forces itself to the bottom of the cup of flowers, where it collects the honey, which passes through the tube into a little bag placed within their bodies, whence the honey is afterward poured out into the cells.

Bees have six feet; with the two first and their fangs they form the wax, which was the farina of flowers, into little balls, and with their middle feet place them in a hollow which they have in their hinder feet, which are furnished with hairs that retain the wax, and prevent it falling off while they fly. Thus, laden with honey and wax, the working bees return to their hives without missing their way, though they sometimes fly the distance of several miles. When arrived at home, they meet other bees waiting to assist them to discharge their burden, and then they all unite together to employ the provisions to the best advantage for the hive in general. With the wax they close up the crevices of their dwellings, to prevent any animal intruding; and they leave only such openings as are necessary for their own convenience. The queen and working bees have at the extremity of their bodies a sting enclosed in a sheath, which they use to wound and destroy their enemies; but when the sting remains in the wound which they make, it is generally fatal to themselves.

Every thing in these little animals is wonderful, and highly deserving of our attention. The structure of their limbs, so regular, and well adapted to their mode of life; the care which they take of their young; the art with which they construct their cells; and their activity, industry, and intelligence; all excite our admiration, and bespeak the agency of a superior power. Thus, if we wish to meditate upon our Creator, contemplating a hive of bees will lead us to him, and call forth our adoration of that power, wisdom, and goodness, so eminently displayed in the production and operations of these little creatures.

JUNE XVIII.

EXTERNAL PARTS OF PLANTS.

In order to form a just idea of the inimitable art displayed in the vegetable kingdom, we must proceed by degrees. Our faculties are too limited to take in the whole at one view, or to acquire a perfect

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knowledge of it in this state of existence. We must, therefore, content ourselves with a few observations, and proceed from visible to invisible things; from simple and individual objects to those which are more complicated and general. Let us begin then with the external parts of plants, and first examine the roots. These are so constructed, that by means of the principal root, and the little fibres that proceed from it, the plants are fixed in the earth. The pores of the root enable it to imbibe the aqueous and nutritious juices which the soil contains. From the root grows the stem, to which the plant owes its strength and beauty: its structure differs according to the nature of the plant; sometimes it is the form of a tube, strengthened by different knots which are skilfully arranged; and in other plants the stem is so slender, that it requires a support round which it may twine and fasten itself by little hooks which proceed from it. In others the stem rises majestically like a pillar, and becomes the ornament of the forests, seeming to defy the winds and the tempests. The branches extend themselves like arms, and are regularly distributed; they enlarge themselves, and divide into others which are collaterally disposed in the same order with the principal branches. The buds which sprout from them are small plants, which if inserted in the earth, will take root, and in time grow up like the tree from which they were taken.

The leaves, those lovely, beautiful ornaments of plants, are regularly disposed round the stalks and branches; and among thousands we can scarcely find two that exactly resemble each other; each one differing in structure, figure, size, and beauty. Leaves are either simple or compound, hairy or fleshy, smooth or curled and indented. The blossoms of trees, which form one of nature's chiefest beauties, are not less diversified than the leaves: some are simple, and have only one flower; others have several. They present every variety of shape and appearance: some of the petals are disposed carelessly round the plant; others form circles, garlands, and clusters. From the centre of the flowers rises a little pillar, and sometimes several, which are hollow within, and round or pointed at the top: these are called pistils, and they are generally surrounded by lesser pillars called stamina, which support the anthers, containing a very fine powder, which is the farina or pollen. Many of the blossoms have a texture of an indescribable delicacy, with a most exquisite fragrance, and beautiful diversity of tints.

To the blossoms succeed fruit and seeds, which repair the waste of the seasons, and afford a very agreeable source of nourishment; they enclose under one or more skins or coats the germs of future plants. The external form of seeds and fruits varies as much as that of leaves and flowers.

All these parts of plants have their peculiar use and design; if the least of them be taken away, the plant loses a part of its perfection; either its beauty, growth, or increase, will suffer. Thus, all these several parts are essentially necessary for the completion of the whole. If a tree is stripped of its leaves, it will soon become dry, decay, and

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wither. The same thing will happen with all other plants; they possess nothing superfluous, nothing that is not useful, or that does not tend to the perfection of the whole.

When we view this beautiful connexion, harmony, and arrangement, throughout the vegetable kingdom, and see that the whole is regulated by general laws, though differently applied, must we not immediately and without hesitation acknowledge, that the Author of all these beauties is a being of a superior nature, enjoying a supreme power and wisdom? This will be the necessary conclusion of every one capable of thinking, and justly weighing causes and effects. Let us then raise our souls towards our heavenly Creator, who is every where visible in his works, and whose wisdom shines in the smallest blade of grass. He who accustoms himself to reflections of this nature will be more sensible of the pleasures of summer, and feel more life and joy from the beauteous objects it presents to his view. The more we contemplate the works of nature, the more shall we admire the wisdom of God; and the more we reverence his wisdom, the greater will be the pleasure we shall derive from the contemplation of natural objects.

JUNE XIX.

HYMN OF THANKSGIVING FOR THE WORKS OF NATURE.

To thee, O Lord, from whom all blessings proceed, and who dispensest them with a liberal hand, to thee belong glory, honour, and thanksgiving. Thou hearest the cries of the young raven, and delightest in the song of the lark; be pleased to hearken also unto my voice, and receive the praises of a grateful heart. The least of thy creatures proclaims thy wisdom, and the traces of thy goodness and power beheld, from one end of the year to the other, are continually renewing.

With the tenderness of a father thou providest for the wants of all thy creatures, and givest them their proper food. The returning sun, as he daily illumes the eastern horizon, witnesses the endless succession of thy benefits, showered down in profusion upon all created nature. O God, who is like unto thee!

Teach me, O Lord, how to praise thee with acceptance, and incline my heart to love thee, that henceforth I may only live for Him who loadeth me with blessings.

It is in thy name, and in the hope of thy blessing, that the husbandman commits his grain to the furrow. It is thou who formest the seed, and enduest it with fertility. The earth, which once was cursed by the sins of mankind, blessed again by its Creator, now brings forth an abundance of fruits.

Thou causest the fertilizing rains to descend upon the furrows of the field: thou clothest the meadows, the valleys, and the plains,

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with flowers, herbs, and groves: and thou directest the cool and refreshing dew to revive our gardens and fields, and to shed upon them fertility and abundance.

The dry and parched land thou waterest with beneficent rains; the wet and cold places thou warmest with the cheering rays of the sun: thou orderest the seasons and the weather with wisdom, and disposest them in the manner most beneficial to mankind; and amidst every vicissitude of heat and cold, of rains and drought, we still see grow, flourish, and ripen, the food which thy goodness has destined for us.

Thou coverest our fields with rich harvests, and the wings of the wind make the yellow ears undulate; thou beautifiest the summit of the dry rock with the clustering grape; thou biddest the clover spring up in our pastures, and at thy desire the fountains and the rivulets refresh the thirsty animals.

Thou causest the tree to take root, and makest it flourish; a vivifying sap circulates through the trunk and branches, and gives them strength to push forth leaves and blossoms; and the fruit, which bends down the branches, shows how much thou delightest in doing good.

Let us then ascribe all glory and praise to our Creator and Benefactor; let us bless and celebrate his name in songs of joy, and attune his mercy in hymns of gratitude: for great is the eternal God, holy and wonderful are all his works; he is all pure and good, and the righteous for ever shall sing his praises.

JUNE XX.

CATERPILLARS.

Caterpillars form a very beautiful part of the creation; though from generally living upon our trees, they are disliked by the cultivators of gardens, and are seldom considered as objects of attention; many people indeed only notice them for their destruction. But if we investigate their nature, and observe them minutely, perhaps we shall find cause to admire them; and our curiosity being awakened by their appearance, we may be less disposed to trample under our feet an insect whose structure is so wonderful, and which will lead the properly reflecting mind to consider the Creator of all living things.

The species of this insect already known are more than three hundred, and new ones are daily discovered, all differing in colour, form, propensities, and modes of life; but they have in common the annular structure, or the being composed of several rings, which, elongating and contracting, facilitate the moving of the body from one part to another. They have two kinds of feet, each of which has its particular use. The six fore feet form a sort of hooks, with which they cling to, or lay hold of, objects; the termination of the hinder feet is broad, and armed with small pointed nails. With the hooks

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they draw up the leaves, grass, and other nourishment; and by these fix the fore part of the body till they have drawn up the hinder part. The hinder feet they use to hold themselves fast, and to grasp whatever they rest upon. When upon a twig or a leaf they can seize another at a considerable distance; for, hooking their hinder feet upon whatever they rest, they elevate the fore part of the body, standing almost erect, move in all directions, poise themselves in the air, and turn round, reach their food, and hold it with their hooks. However well the body of the caterpillar is adapted to its necessities, its state is very transitory; its limbs last only a short time; and this creeping worm soon becomes a chrysalis without feet and without motion, till it becomes a winged inhabitant of the air.

From this circumstance only, caterpillars should claim some share of our attention. Towards the end of summer, and frequently sooner, after being satiated with verdure, and having changed their skins more than once, they cease to eat, and begin to construct a habitation, where they leave the caterpillar state, and are transformed into butterflies; this place of shelter is called the chrysalis, and is of an oval form; towards the extremity are rings, which continue diminishing till they are lost in a point. The chrysalis is full of milky fluid, which supplies the infant butterfly with nourishment till it comes out. When it is completely formed, and its parts have acquired a proper degree of consistence, and a gentle warmth invites it forth from its prison, it forces a passage through the largest end, which is at the same time the thinnest part of the chrysalis. Its head, which was always directed towards this end, disengages itself, the antennæ project and lengthen, the feet and wings extend, and the insect flies away, retaining nothing of its former shape: the caterpillar which was changed into a chrysalis, and the chrysalis which became a butterfly, being quite different creatures. The one is rough, hairy, and sometimes of a disagreeable aspect; the other is decked in the most beautiful colours: the one is doomed to crawl upon the earth, while the other lightly skims from flower to flower, and delicately sips their nectareous sweets.

Perhaps this description will conquer the aversion that some people have to these insects, and reconcile them with their existence; but perhaps there will yet be many who will ask for what purpose insects, which devour the leaves and occasion the trees to be blighted, were created? To such I answer that they are necessary links in the great chain of animal life; and without them the world would be less perfect than it is. Destroy them entirely, and you would deprive the birds of a most plentiful source of nourishment; and surely, if birds are destined to feed upon caterpillars, whatever be our loss, we cannot with justice exclude these insects from feeding upon leaves. And even if we cannot comprehend the reason why God formed such creatures, surely we ought not to assert that they are useless; we should rather acknowledge our ignorance, and bow before him who is all-wise.

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JUNE XXI.

BEGINNING OF SUMMER.

On this day summer begins. Many of us have often seen the changes which constantly take place at this season of the year; but have we considered why the sun continues so long above the horizon, why this is the longest day in the year, and why, from this time till the end of autumn, we perceive the heat and the length of the days diminish in the same proportion? All these changes proceed from the annual revolution of our globe round the sun. When this star enters the tropic of Cancer, the earth is so situated, that the whole of its north pole is turned towards the sun; for the earth's axis is inclined towards the north, and it invariably preserves this direction. On this inclination, and the parallelism of the earth's axis, the vicissitudes of the seasons depend. And who, that considers the consequences which would ensue if the direction of the axis had been perpendicular, will withhold his admiration and gratitude for that superior wisdom which has thus regulated it for the advantage of man?

Nature has now nearly finished her annual labour in our climate. She has already lost part of her variety; and though nothing can be more beautifully green than the vines, the orchard, and the forests, the shades begin to be less pleasing; the meadows whiten, and the flowers are cut down; the corn gradually grows yellow, and the rich colouring of nature diminishes. The diversity and brightness of this, and the varied notes of numerous birds, had lately all the charms of novelty, and cheered us with their sweet variation: but now, as autumn approaches, these enjoyments cease; the nightingale is silent, and walking is inconvenient from the excessive heat.

From this picture we may form an emblem of life, the pleasures of which are equally fugitive; even the most innocent, such as nature offers us during the spring, fade, and give place to other objects; and what we now witness in the summer of nature, we may observe in the summer of life.

As we advance in years, the pleasures which delight us in our youth no longer affect us; and when we have attained the autumn of our days, we become subject to cares and anxieties to which we formerly were strangers; as our age increases, our bodily powers diminish; till at length, after many a weary day, the period arrives when, feeble and exhausted, we have no longer a pleasure in existence.

With what a lively sense of joy may the good man lift up his soul to thee, O Lord! who directest the seasons, who art the Father of all things, and the source of all happiness! Let us acknowledge thy wisdom and thy goodness in causing the seasons to succeed each other in a regular order; and may we never forget thee when we enjoy the blessings which summer scatters over the earth, and expe-

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rience the pleasures which smile in her train! Let us reflect that this may be the last summer which we may be permitted to see on earth; and consider how soon we may be called to join the numerous friends who have been removed from this transitory scene since the last summer's sun beamed light and beauty upon our sphere.

JUNE XXII.

THE NIGHTINGALE.

The nightingale is one of the sweetest songsters among the inhabitants of the groves. When all the birds that cheered us during the day with their varied notes cease to be heard, the song of the nightingale swells upon the air, and animates the groves. When we rapturously listen to her voice, pouring melody in the woodlands, we are ready to conclude that the bird from which such sounds proceed must be large, and possess a throat of uncommon strength; and her sweet accents make us presume that, as she excels in harmony, so she surpasses the feathered race in beauty.* But we shall look in vain for these perfections in the nightingale; which is a bird of rather a mean appearance, having nothing particularly attractive either in form or plumage; yet it is gifted by nature with a voice that fills us with ecstacy, and pours rapture through all our frame. How exquisite is our delight when we listen to her long quivering notes, and hear her sweet variations, now gently warbling, then gradually swelling into inconceivable force and rapidity; alternating plaintive accents that sooth the soul to melancholy, with gay airs that raise it upon lightsome wings to joy and pleasure: she rapidly passes from the simplest notes to the wildest carols, from the lightest turns and quavers to slow melting strains that languish upon the breeze, then softly die away, and leave the night-wanderer silently to retrace his homeward steps.

This bird may give rise to many useful reflections; from it we may learn a very wholesome truth, that plainness of person does not exclude beauty of soul, but may be allied to the most estimable qualities. How absurdly and erroneously do those people judge, who, fascinated by a regular contour of face, beautiful countenance, and elegant proportion of limb, only bestow their approbation upon what pleases their senses, and despise or disregard such as labour under bodily infirmities, or are not gifted by nature with the graces of per-

* As to the idea of connecting beauty with melody in a bird, unless the author means that the bird which utters strains like those of the nightingale cannot be otherwise than beautiful, I believe it is not always the case; for those birds which have the most beautiful and brilliant plumage have often the most harsh and unpleasing notes; witness parrots, parroquets, peacocks, and a variety of others; and so far from our imagining the bird that enchants us with melodious strains to be large in size, we know of scarcely any large bird which has very sweet notes: if so, whence is the association of greatness of bulk and melody of voice!—E.

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son. Let us learn to judge with more equity, and to discriminate with more attention; for it is not alone symmetry of limb, elegance of form, or advantages of fortune and rank, that ennoble a man, and render him worthy of esteem; it is the superior perfection of his soul, and the finer feelings of his heart, which can alone exalt his nature, and place one man higher than another in the great chain of beings. Those who are incapable of virtue, and destitute of reason, will necessarily be deluded by the false colouring of external appearance, and, unable to penetrate beneath the surface, will be dazzled by the empty parade of riches, and misled by the ostentatious display of splendid insignificance. But have we not seen men on whose humble birth fortune never smiled, nor honours distinguished, raise unto themselves eternal monuments of fame and glory? And have we not known men, whose bodies were formed in nature's coarsest mould, show a magnanimity of soul and a greatness of mind that will ever endear them to our bosoms and entwine them round our hearts? Let us then not easily trust an opinion hastily formed, and founded only upon external appearance; for often those whom we have presumed to despise are superior to ourselves, and deserving of our warmest admiration and regard.

When we listen to the sound of the nightingale, let us remember who gave it such pleasing powers; and let us consider the wisdom of a structure which enables it to produce such sweet sounds. A viscus so delicate as the lungs of this little bird, whose exertions are so violent, would be very liable to receive injuries, if it did not possess the singular advantage of being attached to the vertebræ of the back by a number of little fibres. The opening of the windpipe is very wide, and this very probably contributes to its great diversity of notes.

Sweet songster! I will not leave thee till I have learned of thee to celebrate our mutual Creator; and may thou pour, with thy wild warbling strains, joy and gratitude into the hearts of all who in these lovely evenings are revelling in the sweets of summer unconscious of their Maker!

JUNE XXIII.

THE PLEASURES WHICH SUMMER OFFERS TO OUR SENSES.

Summer has inexpressible charms, and daily gives us proofs of the infinite beneficence of God. It is the happy season in which he most abundantly pours forth his blessings upon every living creature. Nature, after having refreshed us with the pleasures of spring, is continually at work during the summer, to procure us every thing that can gratify the senses, make our subsistence comfortable, relieve our necessities, and awake in our hearts sentiments of gratitude.

We see all around us, in the fields and in the gardens, fruits, which, after having delighted us with their beauty and gratified our taste

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with their sweets, may be collected and preserved for our future convenience. The flowers present us with the most agreeable variety; we admire their rich colours, and rejoice at the inexhaustible fecundity of nature, in their multiplied species. What a beautiful variety is displayed in plants, from the lowly sprig of moss to the majestic oak! Our eye glances from flower to flower; and whether we climb the steep mountain, descend into the valley, or seek the friendly shade of the woods, we every where find new beauties, all differing from one another, but each possessing charms sufficient to engage our attention. There we see innumerable flowers diffusing their sweetness to the air, that softly kisses their blushing leaves; and here various creatures sporting wild, free from care. We look up, and a clear blue sky presents itself; beneath the fresh verdure smiles: our ear is ravished with the tuneful notes of the winged songsters; their various and simple melody wraps our souls in joy, and sweet sensations fill our bosoms. The soft murmuring of the distant brook, and the silver waves of a clear smooth stream gently gliding beneath the overhanging willows, lull our souls to ease, and nought but love and pleasure dwells in our unruffled breast.

Thirsty and fatigued, the modest strawberry offers us sweet refreshment; the gardens and fields fill our granaries with their fruits, and supply us with the most agreeable sustenance. The smell is gratified with the fragrance that every where perfumes the air; and thousands of charming objects delight our senses, and call forth our sensibility. Numerous flocks and herds feed upon the bountiful profusion of nature, and furnish us with milk and nourishing aliment. Abundant showers fall to refresh the earth, and open to us new sources of blessings; smiling groves and tufted trees kindly shelter us from the sun's fervid beams; and every thing around us increases our pleasures and adds to our felicity. If the senses derive gratification from these luxuriant scenes, the mind is not less delighted. It discovers beauty, harmony, variety; and in every object traces the all-creating hand, the spring of life, and the source of all good. Yes, admirable Being! we see thee in every creature: if we contemplate the Heavens, the Sun, the Moon, and each Star inform us that thou hast made them; all that we perceive through the medium of our senses leads us to thee, and thus our sensations become dignified and exalted, whilst our thoughts soar upward, and are lost in thy infinitude.

JUNE XXIV.

SKETCH OF THE INTERNAL PARTS OF THE HUMAN BODY.

The more difficult it is to acquire a proper knowledge of the internal parts of the human body, the more necessary it is to profit by the labours of skilful anatomists. With the view of facilitating the know-

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ledge of those parts, I shall here present the reader with a short description of them. The structure of the heart, the great spring of life and motion, first merits our attention. This viscus, situated in the chest, is composed of muscular fibres, curiously interwoven; two cavities, called ventricles, separated from each other by a partition, form the interior of this organ. Contiguous to the heart, within the chest, are the lungs, which alternately open and shut, when they receive or expel the air, something after the manner of a pair of bellows; they nearly fill the whole cavity of the chest, which is lined with a very fine membrane called the pleura.

The abdomen is separated from the chest by a muscle called diaphragm, and contains several viscera, the most important of which is the stomach, a membranous bag, which receives and digests the food. To the right of the stomach is the liver, which secretes bile from the blood, a part of which is received into a little bag attached to the liver, and called the gall-bladder; it is conveyed from thence into the intestines, and stimulates them to action. On the opposite side, and near the stomach, is situated the spleen, a spongy viscus of an oval figure, the use of which is not rightly understood. Beneath the liver on one side, and the spleen on the other, are the kidneys, which secrete from the blood an aqueous fluid, afterward conveyed to the bladder by two excretory ducts called ureters. In the lower parts of the abdomen are situated the intestines, a long membranous tube divided into small and large. In the small part, the alimentary matter which has passed through the stomach is converted into chyle, and the portion that remains unfit for nourishment is expelled by the lower and larger division of the tube. The intestines are connected with the mesentery, a membranous duplicature, which contains numerous fine vessels, called the lacteals, as they contain the chyle or milky fluid separated from the food. There are also numerous glands in this organ, called mesenteric glands; the lacteals enter these, and from thence proceed to the thoracic duct, or the tube which conveys the chyle into the blood. The whole internal surface of the abdomen is lined with a membrane called peritoneum, which covers all the viscera; and a fatty production of which, called omentum, lies on the superior surface of the intestines.

These are the principal viscera in the abdomen and chest; but there are several others connected with them. At the beginning of the neck is the œsophagus and the trachea. The œsophagus is the tube through which the food passes from the mouth into the stomach, and the trachea is the tube through which the air passes into the lungs; a small valve at its superior orifice, whilst it admits the passage of air, prevents that of any other fluid or substance, which, by its irritation in the lungs and air vessels, would be the occasion of fatal consequences. There is a valve also placed in that orifice of the stomach which enters the intestines; it opens to suffer the food to pass, but prevents its returning.

Within the cranium or skull is situated the brain, enveloped in a very fine membrane full of blood-vessels, and called pia mater; a

second membrane, much thicker and stronger, adheres to the internal surface of the cranium; and between these is a third membrane, so very delicate and transparent, as to be scarcely perceptible. Besides these parts, each of which has a determinate place, there are others which are dispersed over the whole body, such as bones, arteries, veins, lymphatic vessels, muscles, and nerves. The bones are united together by joints, and serve to support the body, to render it capable of motion, and to preserve and protect the softer parts. Veins and arteries circulate the life-sustaining blood throughout the body. The nerves, of which ten principal pair are enumerated, are small white cords; they proceed from the brain, are distributed to every part of the body, and are the organs of sensation and motion. The whole body is full of pores, so small as to be imperceptible to the naked eye; and through these is continually exuding a subtile matter called the insensible perspiration. No less wisdom is manifested in the fluid than in the solid parts of the body. The blood, chyle, lymph, bile, marrow, and the different kinds of viscous and glutinous humours secreted by various glands; their different properties, their destination, effects, and the manner in which they are separated and prepared; their circulation and renovation; all bespeak the most astonishing art and the profoundest wisdom.

Let us now recapitulate all the excellencies of our structure. The bones, by their solidity and their joints, form the foundation of this beautiful superstructure; the ligaments are tendinous cords, which unite different parts together; the muscles are fleshy substances, which perform their functions like elastic springs; the nerves, which extend to the most distant parts of the body, communicate the power of sensation, and enable the different organs to perform their functions; whilst the arteries and veins, like inexhaustible rivulets, pour the life streams to every part. The centre of circulation is the heart, from and to which all the blood proceeds; and respiration is performed by means of the lungs. The stomach and intestines are the organs where the food undergoes those changes which are necessary for the support of life. The brain is the common centre from which the nerves proceed to communicate sensation to the body, and enable the senses to receive the impressions which they convey to the soul.

Adorable Creator! how wonderfully hast thou formed us! Though the heavens, which so magnificently display thy glory, were not to exist, though I was the only being upon the face of the earth, the admirable structure of my body alone would suffice to assure me of the immensity of thy power, and convince me of thy immeasurable wisdom! Let us, then, as often as we meditate upon this wonderful organization of our bodies, praise Him who has so formed us, and offer up our thanksgiving for his manifest goodness.

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JUNE XXV.

ELECTRICITY.

From the numerous experiments which have been made upon the subject of electricity, no one can doubt the existence of a matter which, from its singular effects, has excited the attention of Europe for more than half a century. It appears that this fluid is equally diffused through all bodies, but is so extremely subtile that we cannot perceive it, and we only know it to be present from the effects it produces: when put in motion it rushes from one part to another to restore the interrupted equilibrium. It is necessary to distinguish two kinds of electric bodies; those in which the electric fluid may be excited by means of friction, and those which receive their electric power by communication with the former. The principal substances which compose the first class are glass, pitch, resin, sealing-wax, hair, silks, and air; to the second class belong water, metals, &c. Bodies of the first kind may be made capable of preserving the electric matter collected in them, whilst those of the second class lose it as soon as they receive it.* Machines have been invented, in which, by means of a wheel, a rapid rotation is given to a glass globe, or cylinder, upon which is placed a cushion of silk, against which, whilst whirling round, it rubs. By this friction the globe preserves its electric virtue, which may be extended to any distance by means of metallic bars, or chains which communicate with the glass. If, while the machine is working, we touch the chain, we immediately receive a shock; and, if the room is darkened, a luminous spark will be perceived. Let any number of persons join hands and form a circle, and by means of the chain make a communication with the machine; and they will all receive a shock at the same time, which may be made more or less violent. The electric fluid may be accumulated to such a degree as to kill by its discharge the largest animals.

This experiment is performed with several glass jars nearly filled with water, and which, connected together by chains, communicate with the glass globe before described. The water communicates to the internal surface of the jars a great quantity of electric matter, their external surface at the same time losing an equal quantity by means of its communication with some conducting body. A vivid flash, loud explosion, and a violent agitation, ignition of combustible matter, and the death of the subject of the experiment, are the consequences of this experiment.

* Those substances mentioned in the first class, to which may be added diamonds, balsamic and bituminous bodies, as amber, sulphur, &c. the coverings of animals, as feathers, wool, bristles, silk, vitrified bodies, and all substances that, when rubbed, attract light bodies, are called electrics or non-conductors. Those on the contrary in which, when friction is employed, the electric fluid is not excited or put in motion, are called conductors or non-electrics; and they consist chiefly of metals, minerals, aqueous and spirituous liquids, living creatures, and animal and vegetable substances, as trees, plants, bones, shells, &c.

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There are other effects which are common to all experiments of this kind; such as a sulphureous smell, an agitation in the air, a sudden flash, and the electric matter acquiring a new property. Some experiments have failed because the metallic rods which served as conductors were too angular and pointed. It has been suspected that the electric fluid in such cases was dissipated by means of the points; and this was confirmed when, on approaching the face or hand to the point of the rod, a copious stream of electric fluid emanated from them; it was also conjectured, that these points, which throw off the electric fluid, might attract it, and a number of experiments have since established it as a truth.

Electricity has been applied by physicians in many complaints with great success; and a still greater advantage which we derive from its investigation is the analogy which naturalists have discovered between electricity and lightning, which has given rise to new conjectures upon the nature of thunder; and has taught us to secure our buildings, by means of metallic rods, from the destruction they often suffer during a storm.

Thus we are continually receiving new solutions of the mysteries contained in the great works of nature; and from the success of these investigations we should be excited to more industry, and to pay greater attention to the works of the creation daily offered to our view.

JUNE XXVI.

MANNER IN WHICH THUNDER IS FORMED.

Formerly, and even to the beginning of the eighteenth century, it was commonly supposed that thunder was occasioned by the agitation of saline, sulphureous, and other substances contained in the air. It was imagined that there was the greatest resemblance between the effect of fire-arms and that of thunder and lightning. But all the means by which men endeavoured to explain and establish this system were not sufficient to do away the difficulties that presented themselves, nor to account for the fact. Since that period, however, the phenomena produced by the electric fluid have been more attentively observed, and a very different cause has been assigned to the formation of thunder. The great resemblance between it and electricity has convinced naturalists that they are produced by the same causes, and that electricity is in our hands what thunder is in nature. It will not be difficult to demonstrate this, even to those who are ignorant of natural philosophy, if they will only take the trouble to compare the effects of thunder with those of electricity.

The effects of thunder are known by peals heard at a greater or less distance, and by flashes of fire; buildings struck by it are often consumed by flames; men exposed to it become black, and appear

scorched, though there is sometimes no trace of fire, the violence of the stroke having killed them: their clothes are torn, they are thrown to some distance from the place in which they were, and frequently the part of the body which was struck is pierced with holes. Sometimes large stones are broken by the thunder, and its ravages are easily discoverable on the ground where it strikes.

Electricity presents us with similar effects, but in a less degree. When by means of water its force is increased, the electric flash is followed by a very evident commotion: the most compact bodies are perforated, birds and other small animals are deprived of life, and each flash is succeeded by a report. The stream of fire also, which passes from the points of electrified bodies with a hissing noise, is one of the phenomena observable in lightning; and with respect to velocity, there is still greater resemblance between thunder and electricity. If during a storm a sword or chain is suspended in the air by silken strings, they become electrified; and if the finger is advanced near them, sparks proceed from them with more or less force and brilliancy, according to the violence of the storm, and the distance of the electric cloud; in short, every effect of electricity is produced during a thunder-storm. From all these circumstances, we can no longer doubt that the air during a storm is highly electric, and that thunder and lightning are merely the effects of a violent electric fire.*

Thus all that appears supernatural in these phenomena, and the terror that they consequently excite, will be done away as we become better acquainted with the laws of nature. This should induce every one to acquire at least the first principles of natural philosophy. We should then no longer see fear and superstition enervate the mind, and paralyze our exertions in the investigation of nature. Let us employ the little light we have to dispel the fear which troubles us at the approach of a thunder-storm; and, amid the lightning's flash and the roaring of the tempests, we shall regard with a tranquil bosom the God of all, who 'rides in the whirlwind and directs the storm.' For however we may be able to assign the causes of thunder upon just and invariable principles, drawn from natural philosophy, the phenomena are not less remarkable, and present some circumstances which are inexplicable, even to the most enlightened mind. It is sufficient for us to know that the nature of the air, and the peculiar properties of the surrounding atmosphere, render this phenomenon necessary: that these storms are essential to the fertility of the earth, and should therefore excite us to render our tribute of praise and thanksgiving to the all-bountiful Creator.

* Lightning, then, is nothing more than the electric fluid contained in the clouds passing into other bodies, and thus interrupting the equilibrium, and producing concussions in the air, or that noise which we call thunder; and the reason that lightning is seen before the thunder is heard, is that light travels with a velocity inconceivably greater than sound.—E.

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JUNE XXVII.

HERRINGS.

In this season of the year the herring-fishery begins on the coasts of England and Scotland; by which we shall soon receive a great abundance of fish, which supply the inhabitants with food during a considerable part of the year. Let us examine what is most important in the natural history of these fish.

An innumerable multitude of herrings live in the Icy sea, near the arctic pole; at a certain time they quit this abode, and arrive in shoals upon the coasts of England and Holland. The cause of this emigration is not yet ascertained: some suppose it is to escape from the whale, and other great fish of the Icy sea; others imagine that the prodigious multiplication of herrings is the cause of their taking these long voyages; that finding themselves too numerous under the northern ice, they are obliged to detach colonies to other places, that they may have a sufficiency of food for their support. Perhaps it is the desire of propagating their species, and a particular instinct, which leads them to places more favourable for their increase and preservation.

Whatever cause influences their motions, it is certain that immense shoals of herrings proceed from the north in the beginning of the year; for as early as the month of March the western wing of this aquatic army reaches the coasts of Iceland; they are there so extremely numerous, that upon plunging the bucket, with which they water the sails of the vessel, into the sea, they draw up great numbers of these fish. The eastern wing advances farther into the Baltic sea; one part of it stretches towards the North Cape, descends to the coast of Norway, and then enters the Baltic through the Sound. Another division steers for the northern point of Jutland; and afterwards enters into the Zuyder-zee, and passes thence into the Baltic, to return to its former station. The most numerous detachment of the eastern wing proceeds to the western coasts, and arrives at the Orkney islands, where the Dutch go to catch them. About the eighth of June the sea is there filled with them; they afterwards shape their course towards England and the coasts of Scotland, and fill all the bays and harbours with their fry. They then disappear, and those which have escaped the nets of the fishermen, and the numerous large fish which prey upon them, most probably return northward to the place from whence they emigrated.

A single herring deposits at least ten thousand eggs in the sea upon the British coast, and this great fruitfulness of a single fish, among so many millions, makes what is reported of the Dutch fishery credible; they are said to take annually about two hundred millions of herrings, by which a great number of people are supported, and more than twenty millions of crowns added to the Dutch revenue.

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JUNE XXVIII.

ECLIPSES OF THE SUN AND MOON.

In this enlightened age, it is highly indecorous for any one to be ignorant of the phenomena of an eclipse. From a want of this knowledge have proceeded the superstitious fears which so often agitate the minds of the ignorant during an eclipse of the sun or moon; while, if the cause was understood, the folly of shutting up wells at such a time, for fear the water should acquire a noxious quality, and the absurdity of using other precautions, would be manifest: whatever men do under the influence of superstition is a strong proof of their ignorance and impiety. Let us, then, inquire into the true cause of such astonishing effects; our thirst for knowledge will be gratified, and we shall find fresh occasion to glorify our great Creator.

An eclipse of the sun is a natural effect caused by the shadow of the moon projected on the earth. But this can only take place when the moon, which is an opaque body, is nearly in a direct line between the sun and the earth; in this case the moon, either partially or entirely, intercepts our view of the sun; the one is called a total, the other a partial, eclipse. Thus the solar eclipse is nothing more than the situation in which the earth is placed when the shadow of the moon falls upon it, and consequently, properly speaking, it is only an eclipse of that part of the earth where the moon's shadow falls.

Hence we learn that the sun is not really darkened, but is only for a short space concealed from us by the intervention of another body, whilst he still blazes in all his splendour; and the only change that takes place is, that the rays emanating from him cannot reach the earth, because the moon intercepts their progress. Hence also a solar eclipse is never visible at the same time from every part of the earth: for the eclipse could not be perceptible from all places in the hemisphere at the same time, unless the sun had effectively lost all his light; on the contrary, it appears greater in some countries than in others; and there are countries where it is not visible at all.

The moon not only at times darkens the earth, but the earth also casts its shadow upon the moon, and thus partially or totally intercepts the rays of the sun, by which an eclipse of the moon is occasioned. This can only happen when the moon is on one side of the earth and the sun on the opposite side, consequently, at the time when the moon is at the full; and as this planet is really obscured by the earth's shadow, the eclipse may be perceived at the same time from every part of one hemisphere of our globe.

Should it be asked, Of what use are the lunar and solar eclipses? I would answer, to those who do not measure the utility of natural things merely by their sensible benefits, they are of very great use. By their means we determine the true position and distance of towns and countries, and trace with exactness maps of the most remote regions; they also tend to confirm chronology, and direct the naviga-

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tor, by informing him how far he is distant from the east or from the west. Unimportant as these advantages may appear to some, they are of the greatest utility, and contribute in part to the happiness of mankind.

Whenever we witness an eclipse of the sun or moon, let us reflect upon the awful events which will take place on the last day. What terror will seize the hearts of men when they shall see the sun darkened, and the moon lose her light; when the elements shall melt with fervent heat, and the heavens pass away with fearful sound, as of the rushing of mighty waters! May we then be found fit to dwell in that glorious habitation, where the sun and the moon shall no longer be necessary!

JUNE XXIX.

THE STALK OF WHEAT.

We see the young corn daily springing up, and the tender ears ripening insensibly, till in a few weeks they will afford us nourishing bread, a blessing which the bountiful hand of Nature has bestowed upon the labours of man. Let us for a while cast our eyes over a field of wheat, and endeavour to enumerate the millions of ears which wave over the surface; and then let us reflect upon the wisdom of those laws which cause such abundance to bless the earth. What preparations are necessary to procure us nourishment so useful and sweet; and what changes must take place before the ear could be formed! It is now nearly ready to reward our care with its nourishing fruits, and invites us to meditate upon its structure.

When a grain of wheat has been some time in the ground it shoots up a stalk, which rises perpendicularly, but advances very gradually, to favour the ripening of the grain. By its growing so high the grain is preserved from the moisture of the earth, which would rot it; and the height of the stalk also contributes to perfect the juices that ascend from the root: and its round form favours this operation, by admitting the heat to penetrate every part of the stem. It seems wonderful that so delicate a stalk should support itself, and bear so many grains, without sinking beneath its burden, or being beat down by each blast of wind; but nature has wisely provided against all these inconveniencies in furnishing it with four very strong knots, which strengthen it without lessening its pliability. The structure of the knots evinces much wisdom; like a fine sieve, they are full of very small pores, through which the sap rises and the heat penetrates. The stalk is liable to be beat down by tempests and heavy showers, but its suppleness secures it from injury; it is flexible enough to bend without breaking; if it was more stiff it might be shivered by the storm, and would be unfit for straw.

From the principal stalk others spring up; they are not so high,

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and bear leaves, which, collecting the drops of dew and rain, supply the plant with those nutritious juices so necessary to its support; whilst the most essential part of the plant, the ear, is very gradually formed. To preserve the tender sprouts from the dangers and accidents which might destroy them, the first moment of their appearance, the two upper leaves of the stalk unite closely, to preserve the ears, as well as furnish them with the necessary juices. As soon as the stalk is sufficiently formed to be able of itself to supply the grain with juices, the leaves gradually dry, that nothing may be taken from the fruit, and that the root may have nothing to support which is useless. When these leaves are removed, the young ear waves gracefully in unveiled beauty, and its beard serves it both as an ornament, and as a defence against birds and insects. Refreshed with gentle rains, it flourishes, and inspires the husbandman with the most pleasing hopes; it ripens from day to day, till at length, bowing beneath the weight of its riches, its head falls beneath the sickle, and the farmer joyfully gathers the golden sheaves.

Here we discover new marks of the wisdom and all-beneficent power of God, ever operating for the good of man. How wonderful is the structure of a single stalk of wheat! and what greater proof can we desire of the goodness of our Creator? Open your eyes, ye that are indifferent, and see the fields wide waving round with the choicest gifts of heaven, and you will no longer withhold the tribute of praise and of gratitude to your all-bountiful Father; remembering, that he who can view a field of corn without his soul expanding with gratitude, or who does not feel rejoiced at the sight, is unworthy of the bread it so abundantly furnishes. Let us think as men endowed with minds capable of that most exquisite of all pleasures, the discovering the traces of an infinitely good and powerful Being in all the works of nature; by this we shall raise ourselves above the condition of brutes, and approach nearer to the angels of light.

JUNE XXX.

THE BLIGHT.

Prodigious swarms of little insects, entirely covering the tops, stalks, and leaves of plants, occasion what is usually called the blight. These insects are as numerous in their varieties as the species of plants they infest, and they merit our attention most particularly from the peculiarities which they exhibit. They not only lay eggs, but they also bring forth their young alive; being both oviparous and viviparous. Whilst the fine weather continues, the young ones issue from the parent insect alive, and completely formed, because at that time the plants can afford them sufficient nutriment: but towards the end of autumn they lay eggs, which are not hatched till the following

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spring; for if they came to life sooner, they would perish for want of nourishment.

At the time when the female insects begin to lay their eggs, the males are observed to appear, which seem to indicate that their existence was not necessary before that period; and this conjecture is confirmed by the experiments which have been made upon these insects. If we take one at the instant of its birth, and enclose it by itself within a glass, though secluded from all communication with other insects, it will produce a young one as soon as it has acquired a certain degree of growth, and in a few weeks it will be surrounded by a numerous family. If the experiment be repeated upon one of its young, the result will yet be the same, though continued for many generations; which proves that these creatures engender of themselves without copulation.

Another singularity worthy of observation is, that in some species of insects the males have wings, whilst the females are destitute of them: but in the class of which we now treating, both sexes are alike in that respect; being either both furnished with wings, or both destitute of them. Those which have wings are so extremely small, that they are seen walking upon those that have none. This remarkable instance of the singularities of nature, so widely differing from the common rules, and where at the same time so much wisdom is observable, leads us naturally to ask, Whence these peculiarities in nature proceed, and why has the Creator thought fit sometimes to deviate from the accustomed laws? To answer these questions in a satisfactory manner we ought to be able at once to embrace the whole of the creation, to comprehend all the parts of the vast kingdom of nature, with all their uniting links, and justly to appreciate in what and how far any thing would be advantageous or prejudicial to the whole. But from the limited nature of our faculties, such an extensive range of knowledge is denied us, and we must be satisfied with some general reasoning which may in some degree resolve our doubts, and answer the question to our satisfaction.

In the first place, by these singularities in the productions of nature, we see the command which God has over her: He is the supreme Governor, who assigns to each being the laws which he is to observe; and he who has the power to make has also the right to suspend laws, and to make whatever exceptions he pleases. Secondly, we every where find in nature a great variety of objects which give us occasion to rejoice in their contemplation, and to admire the glory of the Creator. It is easy to perceive how much these exceptions to general rules increase the variety we observe, and consequently the pleasure of the observer, as well as his admiration for the Author of nature. In the third place, experience teaches us that the objects which we daily see become familiar, and the often-repeated impression renders us less attentive to their beauties. The magnificent spectacle of nature does not always interest us, because we acquire the habit of lightly passing over those things which we continually witness. Thus, each singularity, each unusual appearance, by arresting our

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attention, tends to invite us to contemplate, as well as to call forth our admiration of, the works of God. And lastly, we may consider the singularities of the physical world, so far from diminishing the perfection of the whole, enter into the plan of the Divine Wisdom, and together with the singularities of the moral world, are under the direction of an all-wise Being, who governs all for endless glory, perfection, and happiness.

JULY I.

FOREIGN PLANTS.

All our different sorts of corn, and many of our vegetables, derive their origin from foreign countries, generally those of a higher temperature than ours. The greatest part of them came from Italy; Italy obtained them from Greece; and Greece from the East. When America was discovered, many plants and flowers were found that till then were unknown, and have since been transplanted to Europe, where they have been cultivated with great success: and the English still take great pains to cultivate in their own country many different plants from North America.

Most of the different species of corn, which form the best kind of nutriment for men and animals, are graminous; and though they are now completely naturalized to our soil, and the fields are covered with them, they are of foreign growth. Rye and wheat are indigenous in Little Tartary and Siberia, where they still grow without culture. From what country barley and oats were first introduced we are ignorant; but we may be assured they are not natives of this climate, or it would not be necessary to cultivate them. Rice is the produce of Ethiopia, whence it was carried into the East, and afterward to Italy. Since the commencement of the eighteenth century, it has been cultivated in America, and we now import from that country great quantities of this useful grain. Buckwheat originally came from Asia; it was introduced into Italy at the time of the crusades, from whence it was brought to Germany.

Most of our pulse and herbs have also a foreign origin. Borage comes from Syria; cresses from Crete; the cauliflower from Cyprus; and asparagus from Asia. We are indebted to Italy for the chervil; to Portugal and Spain for the dill-seed; to the Canary Islands for fennel; and to Egypt for aniseed and parsley. Garlic is a production of the East; shallots come from Siberia, and the horse-radish from China. We are indebted to the East Indies for kidney beans; to Astracan for pompions; to France for lentils; and to Brazil for potatoes. The Spaniards brought the tobacco plant from Cuba, where the finest species of tobacco is found.

Some of our most beautiful flowers are also the produce of foreign countries. Jessamine comes from the East Indies; the elder-tree

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from Persia; the tulip from Cappadocia; the narcissus or daffodil from Italy; the lily from Syria; the tuberose from Java and Ceylon; the pink from Italy; and the aster from China.

Let us regard these gifts of Nature with joy and gratitude, and thank our Heavenly Father for the abundance of his bounty, in thus contributing to our pleasure and well-being, by making the remotest regions of the earth tributary to our necessities. Let us also endeavour to become acquainted with the nature of the globe which we inhabit. There is an universal transmigration over all the earth; men, animals, and vegetables are transplanted from one country to another: and may we all, wherever our lot may be cast, endeavour to do our duty as men, and so live that our names shall be revered by the just and the good whilst living, and when happily transplanted to that country where our toils shall end, and our troubles cease, our memory shall be blessed, and our departure be lamented, by thousands who have tasted of the sweets of our converse, and received the benefits of our exertions for the general good of mankind

JULY II.

TRANSFORMATION OF CATERPILLARS.

The transformation of a caterpillar into a butterfly is a very curious phenomenon, and highly deserving our attention. The manner in which caterpillars prepare for their change is truly wonderful: they do not immediately become butterflies, but pass first through a sort of middle state. After shedding its coat three or four times, the caterpillar strips itself of its last skin, and becomes a substance not in the least resembling a living creature. It is then enveloped in a hard shell called chrysalis or nympha, in which state it remains two or three weeks, sometimes even for six or ten months, until at length it comes out in the form of a butterfly.

There are two kinds of butterflies; the wings of one are raised, those of the other are flat; the first species fly during the day, the latter by night. The caterpillar of the night-butterfly spins a cone, and shuts itself up in it when the time of its transformation approaches. Those which, when become butterflies, fly during the day, suspend themselves in the open air on a tree, a plant, a wall, &c. In order to do this, they spin themselves a very small web, with an extremely fine thread, and then suspend themselves in such a manner that their heads are a little bent back towards the top. Some of these caterpillars, particularly those of the hairy species, remain in this state, hanging perpendicularly with their heads downward; others spin a thread, which passes round the middle of their body, and which is fastened at both sides. In one or other of these ways all caterpillars of the day-butterfly prepare for the great revolution they are about to undergo. Thus both species of caterpillars bury themselves alive,

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and seem quietly to await the termination of their caterpillar state, as if they knew that after a short repose they would receive a new existence, and appear again under a more brilliant form.

From considering the transformation of the caterpillar into the butterfly, we may proceed to the consideration of a much more noble and exalted subject, the death and resurrection of the righteous. Death resembles a state of sleep, a soft repose, in which our nature rests after the toils, the pains, and the miseries of this life. For the space of a moment we are deprived of sensibility and motion, that we may awaken to glory and a happy existence.

What is a caterpillar? A creeping worm, insignificant and despised, which, whilst it crawls along through life, is exposed to various accidents and injuries. And what is man? Is his condition in this world much better? Is he affluent and fortunate, he flutters gayly in the beams of prosperity, and often equally insignificant with the butterfly, struts his hour, and passes into airy nothing, unlamented and unregarded. But these, compared with the children of penury and misfortune, are few: the greater part of men have to pass from their cradle to their grave through toil, misery, and poverty; most men have to labour from morn till night like beasts of burden, without the power or the hope of enlarging their minds, and, expanding their ideas beyond the confined atmosphere of their workshop; or the ale-house, where they herd together to solace themselves with smoke and beer after the fatigues of the day.

As the caterpillar prepares with care for its transformation, and the state of inaction and insensibility which it is shortly to undergo; so in a different way, but not less earnestly, does the good man prepare for, and expect with a cheerful acquiescence and fond hope, that awful change when he is to undergo a temporary death, to enter into a joyful state of perfection and immortality.

The sleep of the caterpillar is not perpetual, it is merely the precursor of a new state of existence: after its transformation it appears again more perfect and brilliant: before, it crept upon the earth; it now flies in the air, and lightly skims over the surface of a thousand flowers, sipping honey and nectareous dew.

In all this we may observe a lively emblem of the death and resurrection of a righteous man. That body which was feeble, sensual, and gross, refined from its earthly nature, puts on a glorious immortality, and is clothed with perfection; that mind which was so limited in its faculties and confined in its powers, subject to passions and emotions that degraded its heavenly essence, so contracted and weak that it could not penetrate mists of prejudice, and so blind that it could not perceive truth, now, pure as light, and boundless as infinity, views the whole extent of nature, and sees at once millions of worlds; communes with angels, and expands to the infinite God, the source of all power, wisdom, and glory. We have here an important lesson: if this be the glorious change we expect, let us make timely and effectual preparation for it. If our present state be but transitory and imperfect, let us not make it our chief object: let not the few mo-

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ments which are allotted us for our preparation for eternity be misspent, or the reason why we have them mistaken.

JULY III.

THE SILK-WORM.

The genus of caterpillars, which we have just seen, is divided into two general classes, one of which comprehends the diurnal, the other the nocturnal butterflies; is farther divided into different families, each of which has its distinct characteristics and properties.

Thus the silk-worm is a species of caterpillar, and like it is formed of several moveable rings, and is well furnished with feet and claws, to rest and fix itself where it pleases. It has two rows of teeth, which do not move upwards and downwards, but from right to left, which enables it to press, cut, and tear the leaves in every direction. Along the whole length of its back we perceive through its skin a vessel which performs the function of a heart. On each side of this insect are nine orifices, which answer to as many lungs, and assist the circulation of the chyle or nutritive juice. Under the mouth it has a kind of reel with two holes, through which pass two drops of the gum with which its bag is filled; they act like two distaffs, continually furnishing it with the materials of which it makes its silk. The gum which distils through the two orifices takes their form, lengthens into a double thread, which presently loses the fluidity of the liquid gum, and acquires the consistence necessary to support or to envelope the worm. When that time arrives it joins the two threads together, by gluing them one over the other with its fore feet. This double thread is not only very fine, but also very strong, and of great length. Each bag has a thread which is nearly five hundred German ells long; and as this thread is double, and joined together throughout its length, each bag will be found to contain a thousand ells of silk, though the whole weight does not exceed two grains and a half.

The life of this insect in its vermiform state is very short, and it passes through different states till it gradually arrives at its greatest degree of perfection. When it first emerges from the egg it is extremely small, perfectly black, and its head of a still brighter black than the rest of its body: in a few days it begins to grow white, or of an ash colour; its coat becomes dirty and ruffled; it casts it off, and appears in a new dress; it becomes larger and much whiter, though a little tinged with green, from feeding upon green leaves. After a few more days, the number of which varies according to the degree of heat and quality of its nourishment, it ceases to eat, and sleeps for nearly two days; it then agitates and frets itself extremely, becoming red with the efforts it makes; its skin wrinkles and shrivels up, it throws it off a second time, and gets rid of it with its feet. Thus within the space of three weeks or a month we see it fresh dressed three times. It

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now begins to eat again, and might be taken for a different creature, so much is the appearance of its head, colour, and figure, altered.

After continuing to eat for some days, it falls again into a lethargic state; on recovering from which it once more changes its coat, which makes the third since it issued from its shell. It continues to eat for some time, then entirely ceasing to take any nutriment, prepares for itself a retreat, and draws out a silken thread, which it wraps round its body in the same manner as we might wind thread round an oval piece of wood. It remains quietly in the bag it has formed, and at the end of fifteen days would pierce it to issue forth, if it be not killed by being exposed to the heat of the sun, or shut up in an oven. The silk-cones are thrown into warm water, and stirred about with birch twigs to draw out the heads or beginning of the threads, and the silk is afterwards wound upon reels made for the purpose.

Thus we are indebted to this little insect for great luxury in clothing: a reflection which ought to humble our pride; for how can we be vain of the silk which covers us, when we reflect to whom we are indebted for it, and how little we are instrumental in the formation of those beauties in our clothing of which we are vain?

Thus we find the most insignificant and despicable objects are the instruments of ornament and advantage to man; an insect that we scarcely condescend to look at becomes a blessing to thousands of human beings, and forms an important article of trade, and a great source of riches. Let us, then, instead of passing our days in the routine of indolence and luxurious dissipation, imitate the industrious silkworm, and endeavour, by the unremitting and assiduous cultivation of our faculties, to render ourselves useful to mankind; and if we are neither able nor fortunate enough to discover some new truth, let us at least attempt to make all within the circle of our influence happy and contented by our generous exertions for their welfare.

JULY IV.

THE RAINBOW.

When the rays of the sun strike upon drops of water falling from the clouds, and we are so placed that our backs are towards the sun, and the clouds before us, we observe a peculiar phenomenon in the heavens called a rainbow. The drops of rain may be considered as small transparent globules upon which the rays fall, and are twice refracted and once reflected. Hence proceed the different colours of the rainbow: they are seven in number, and appear in the following order; red, orange, yellow, green, blue, indigo, and violet. These colours appear the more vivid as the clouds which are behind are darker, and the drops of rain fall closer. The drops falling continually produce a new rainbow every moment, and as each spectator observes it from a particular situation, it happens that scarcely two men,

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strictly speaking, see the same rainbow; and this meteorous appearance can only last whilst the drops of rain continue to fall.

If we consider the rainbow merely as a phenomenon of nature, it presents one of the most beautiful spectacles we can possibly conceive, and is one of the most magnificent of nature's pictures; but when we recollect that God has made this meteor a sign of his mercy, and the confirmation of his holy covenant vouchsafed to mankind, we may make it the subject of a most edifying, as well as pleasing, reflection. When the rain descends from one extremity of the horizon to the other we cannot see a rainbow, because to form this meteor the sun must appear at the same time with the rain; and when the sky is only covered with clouds on one side, and the sun appears on the other, it is a sign that these clouds will soon disperse, and that the sky will become clear and serene; this also is the reason why we cannot see the rainbow unless the sun is behind, and the watery cloud before us. In order to form the rainbow, then, the sun and the rain must both be present at the same time: we may therefore rest assured, every time we witness this beautiful phenomenon, that we are safe from the inundation of a deluge; for, to effect this, the rain must descend in torrents from all parts of the heavens, and if this happened the sun could not be seen. We could not see the colours of the rainbow if the sky was too clear; to produce such an effect a part of the horizon must be covered with thick clouds.

All these considerations naturally dispose our minds to pious reflections. As often as we see the Heavens adorned with the beautiful colours of the rainbow, we may truly say, How great is the majesty of God! How wonderful his goodness towards his creatures! We still see that He remembers us in mercy. Let us then bow before and adore Him who keeps his covenant, and fulfils all his merciful promises; blessed be his name through all the ages of eternity!

JULY V.

BIRDS' NESTS.

The construction of birds' nests shows us many curious objects, which cannot be uninteresting to the reflecting mind. Who can help admiring those little regular edifices composed of so many different materials, collected and arranged with so much pains and skill; and constructed with so much industry, elegance, and neatness, with no other tools than a bill and two feet? That men can erect great buildings, according to certain rules of art, is not surprising, when we consider that they enjoy the reasoning faculty, and that they possess tools and instruments of various kinds to facilitate their work; but that a delicate little bird, in want of almost every thing necessary for such an undertaking, with only its bill and claws, should know how to combine so much skill, regularity of form, and solidity of structure,

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in forming its nest, is truly wonderful, and never enough to be admired. We shall therefore consider it more minutely.

Nothing is more curious than the nest of a goldfinch. The inside is lined with cotton, wool, and fine silky threads, while the outside is interwoven with thick moss; and that the nest may be less remarkable, and less exposed to the eye of observers, the colour of the moss resembles that of the bark of the tree or of the hedge where the nest is built. In some nests the hair, the down, and the straws, are curiously laid across each other, and interwoven together. There are others, all the parts of which are neatly joined and fastened together by a thread which the bird makes with flax, and horse or cow-hair, and often of spiders' webs. Other birds, as the blackbird and the lapwing, after having built their nest, plaster the outside with a thin coating of mortar, which cements and binds together all the lower parts, and which, with the help of some cow-hair or moss stuck to it whilst the plaster is wet, keeps it compact and warm. The nests of swallows are differently constructed from all others. They use neither sticks, straws, nor flax; but they compose a sort of cement, with which they make themselves nests, perfectly neat, secure, and convenient. To moisten the dust of which they form their nest, they frequently skim over the surface of some lake or river, and, dipping their breasts into the water, shake their wet feathers upon the dust till it is sufficiently moist, and then knead it up into a kind of clay with their bills.

But the nests most worthy of our admiration are those of certain Indian birds, which suspend them with great art from the branches of trees, that they may be secure from the pursuit of several animals and insects. In general each species of bird has a peculiar mode of placing its nest: some build them on houses, others in trees, some in the grass, others in the ground; and always in that way which is most adapted for their safety, the rearing their young, and the preservation of their species.

Such is the wonderful instinct of birds in the structure and disposition of their nests, that we may almost conclude they cannot be mere machines; so much industry, intelligence, sagacity, and skill, do they display in the construction of their nests. And is it not apparent that in all their works they propose to themselves certain ends? They make their nests hollow, forming the half of a sphere, that the heat may be better retained. The outside of the nest is covered by substances more or less coarse, not only to serve as a foundation, but to prevent the wind and insects from entering. The inside is lined with the most delicate materials, such as wool and feathers, that the nestlings may be soft and warm.

Is it not something nearly approaching to reason which teaches the bird to place its nest in such a manner that it is sheltered from rain, and out of the reach of destructive animals? Where have they learned that they are to produce eggs which will require a nest to prevent them from being broken, and to keep them warm? That the heat would not be sufficiently concentrated if the nest were larger, and

that, if it were smaller, all the young ones could not be contained in it? Who has taught them not to mistake the time, and to calculate so exactly that the eggs are not laid before the nest is finished? These questions have never been satisfactorily answered, neither can this mystery in nature be clearly explained: all we can do is to refer it to an instinct which some animals seem to possess in a manner almost equal to reason: and instinct to them is much more happy and beneficial than reason would be; for they seem to enjoy all the sweets of life without their moments being imbittered by the consideration of their inferior rank in the creation, and without the pain of anticipating evil.

JULY VI.

DIVERSITY OF PLEASURES IN NATURE.

To whatever part of the creation we direct our view we find something to interest and gratify either our senses, our imagination, or our reason. Universal nature is formed to present us with a multitude of pleasing objects, and to procure those new and varied delights which continually succeed each other. Our inclination for variety is continually excited and always gratified; there is no part of the day in which we do not find some gratification for our senses or for our minds. Whilst the sun illumines the horizon, plants, animals, and a thousand pleasing objects, gratify our view; and when night extends her sable mantle over the earth, the majestic grandeur of the firmament occasions rapture and astonishment. Every where Nature works to procure us new enjoyment; even the smallest insects, leaves, and grains of sand, offer subjects of admiration: and he who is not struck with this infinite diversity, and does not acknowledge in it the goodness of God, must be blind indeed; and little are his feelings to be envied whose heart does not throb with pleasure at the sight of nature's beautiful objects.

The same brook that waters the valleys, murmurs sweet music in our ear, invites us to soft repose, and refreshes the parched tongue. The grove which shields us from the piercing rays of the sun by its protecting shade, makes us experience a delicious coolness; reclining at ease beneath the lofty trees, whilst we listen to the joyful songs of the birds, a thousand sweet sensations sooth our souls. The trees, whose beautiful blossoms so lately delighted us, will soon produce the most delicious fruits; and the meadows, waving with the ripening corn, promise an abundant harvest.

Nature presents us with no objects pleasing and useful in only one respect; she clothes and adorns the earth with green, a colour the most beneficial and agreeable to the eye, and adds to its beauty by diversifying its shades; for, though pleasing in itself, its charms are much increased by this happy distribution of shade. Each species of

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plant has its peculiar colour; landscapes covered with woods, bushes, plants, vegetables, and corn, present a most beautiful scene of verdure, where the colouring is infinitely varied, and its shades insensibly blended, increasing from the lightest tints to the darkest hue; and yet a perfect harmony is always preserved.

Every month of the year brings us different plants and new flowers. Those which are decayed are replaced by others, and by thus succeeding each other there is no perceptible void in the vegetable kingdom.

But to whom are we indebted for these numerous and diversified presents? Who is it that provides for our wants and pleasures with so much goodness and munificence? Go and ask universal nature: the hills and the vallies will inform thee, the earth will teach thee, and the heaven is a mirror in which thou mayest behold the Author of these blessings. The storm and the tempest announce him; the voice of thunder and the fire of lightning, the bow painted in the heavens, the rain and the snow, proclaim his wisdom and goodness. The green meadows, the fields yellow with the ripe grain, the mountains whose lofty summits are lost in the clouds, the trees bending with fruit, gardens variegated with flowers, and the rose's delicious bloom, all bear the stamp of His impression. The birds celebrate him in their melodious concerts: the sportive lambs; the stag, bounding through the forests; the worm that crawls in the dust; the ocean-monarch, the huge whale, that with its gambols sinks ships, and tumbling in the foam makes the waves roar; the fearful crocodile; the elephant, that carries towers upon its back; all the animals that people the air, the earth, and the sea, declare the glory and proclaim the existence of Almighty God. Let us then open our ears to this universal voice of nature, which speaks a language we cannot resist; and let us, that are the happy witnesses of these wonders of God, come and render unto him, in the presence of his creatures, that testimony of gratitude and adoration which is due to him for so many blessings.

We cannot look around but every thing reminds us of his infinite goodness, and calls forth our gratitude and joy; when we walk abroad into the fields, and see the rich corn, the flocks feeding, and the verdant groves, may our souls be filled with pleasure, and our hearts rejoice in bliss! We shall then experience that there is no greater and more durable satisfaction than that arising from the contemplation of Nature's works, which the longer we consider the more we shall admire: and the more attentively we observe the more shall we discover that God is a pure being, who loves mercy and goodness, and that the Christian religion is a source of unfading joy, and a continual motive for grateful adoration.

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JULY VII.

A FLOWER-GARDEN.

Let us now take a view of the flower-garden, and consider the numerous and varied beauties which are collected in so small a space. The art and industry of man have made it the receptacle of the most beautiful flowers. But what would it have been without care and industry? A wild desert, full of thorns and weeds. And such would be the condition of our youth if their education were neglected, and their minds remained uncultivated. But when children early receive instruction, and imbibe good principles, they are like sweet blossoms, delightful in beauty, and soon productive of fruit that will benefit society.

Observe the night-violet, or julian flower, which towards evening perfumes the garden with its fragrance, in which it excels all other flowers; but it has no beauty, and has scarcely even the resemblance of a flower: it is small and of a gray colour, approaching towards green, so as to be scarcely distinguished from the leaves; humble and modest, it scents the whole garden, though it is not perceived in the multitude; and it is almost incredible that a flower of such insignificant appearance should give out odours so exquisitely sweet. It may be said to resemble a person who is not handsome, but whose want of beauty nature has more than compensated by a ready wit and enlarged mind. The pious man often does good in silence and privacy, and the sweet incense of his good works ascends all around him; and when we become acquainted with this amiable character, we perhaps find him neither distinguished by elegance of person nor elevation of rank.

The carnation combines both beauty and fragrance, and is one of the most perfect of flowers; in the richness and beauty of its colours it approaches the tulip, and surpasses it in the number of its leaves and in the elegance of its form. This flower is the emblem of a person in whom sense and beauty are united, and who has the happiness to conciliate the love and respect of his fellow-creatures.

Let us next observe the rose: its colour, form, and perfume, all charm us; but its beauty soon fades, and the attractions which distinguish it from other flowers soon cease. This is a useful lesson to those who pride themselves upon beauty only: from the short-lived honours of the rose, let them take warning how frail and perishing are the charms of person and the elegance of form. 'All is vanity; all flesh is as grass, and all the glory of man as the flower of the field; the grass withereth, and the flower fadeth away.' The lilies and the roses of a beautiful face fade like the flowers of the garden, and death leaves no trace of them behind. Let us then be wise enough to seek our happiness and repose from more certain and durable sources. Wisdom, virtue, and the blessings of Christianity, never fade, and are

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never exhausted; they are the eternal fountains of joy whose waters shall refresh when every other source is dried up.

JULY VIII.

PHENOMENA OF A THUNDER-STORM.

However terrible the effects of storms and of thunder may be, they present a spectacle so grand and astonishing that they claim our most earnest consideration. An examination into their nature and effects is the more necessary, because it often happens that an excessive fear prevents our considering this grand and awful spectacle with sufficient attention.

When a stormy cloud or collection of vapours highly electrified approaches so near a high building, or a cloud which is not electrified, that an electric spark escapes from it, an explosion takes place, which is called a clap of thunder; and the vivid light that we see is lightning. Sometimes we only see a sudden and momentary flash; at other times a train of fire shoots through the heavens in a forked or zig-zag form. The explosion which accompanies the lightning demonstrates that the vapours which occasion the thunder, becoming suddenly ignited, violently agitate and expand the air; with the emission of each electric spark an explosion is heard, and the thunder is sometimes composed of several claps, or is prolonged and multiplied by echo.

There is generally some interval of time between the lightning and the thunder-clap, and this enables us to judge of the degree and nearness of the danger; for sound requires some time to reach our ear, while light passes so rapidly, that, travelling through the same space, it strikes upon our organs of vision much sooner. As soon, therefore, as we see a flash of lightning, we have only to count the seconds that intervene before we hear the thunder; or if we have not a watch, we may count how many times our pulse beats between the clap and the flash; if we can reckon ten, we are certain that the thunder is distant a quarter of a league; for about forty pulsations may be felt whilst the sound travels the space of one league.*

Lightning does not always proceed in a right line from above downwards, but often in a serpentine or zig-zag direction, and sometimes does not flash till very near the ground. The electric matter which reaches the earth, or takes fire near it, never fails to strike; but it has not always force enough to reach us, and, like an ill-charged bomb, is spent in the air without doing any injury: but when the combustible vapours reach the ground they often occasion great damage.

* Perhaps it may assist those who are not accustomed to this kind of calculation, to be aware that sound passes about one thousand feet in one second of time; so that if twenty seconds can be counted between the clap and the flash, the place where the thunder is generated is distant twenty thousand feet.—E.

However, as uncultivated tracts of land, deserts, and places where there are no habitations, form the greatest part of our globe, the thunder may often peal, and the lightning's flash pierce the earth, void of harm. The course of lightning is very singular and uncertain, and depends upon the direction of the wind, the quantity of exhalations, and various other causes. It passes wherever it meets with combustible matter, as when gunpowder is lighted the flame runs along the course of the train, firing every thing in its way.

We may judge of the force of the lightning by the astonishing effects it produces: such is the ardency of the flame that it consumes all combustible bodies; it even melts metals, but often spares the substances contained in them when they are sufficiently porous to admit of a free passage through them. It is owing to the amazing velocity of the lightning that the bones of animals are sometimes calcined without the flesh being at all injured; that the strongest buildings are thrown down, the trees torn up by the roots, or cleft, the thickest walls overturned, and stones and rocks broken and reduced to powder. To the sudden rarefaction and violent agitation of the air, produced by the intense heat and velocity of the lightning, may be attributed the death of those animals that are found suffocated without any appearance of having been struck by lightning.

Let us then meditate in silence upon the awful and sublime appearance of a storm; when we see the black clouds gather, and the sun withdraw his light, as if to hide himself from the contending elements, let us remember it is the Lord Omnipotent 'who bows the heavens, and comes down with darkness under his feet.' The winds rush from the four corners of heaven, and the storm thickens; but God himself is in the whirlwind, and 'walketh upon the wings of the wind.' At his command the clouds retire, and the thunder and red lightning disperse. 'Hearken attentively to the sound of his voice, to the terrible sound that goeth out of his mouth. He directeth it under the whole heaven, and darts his lightning unto the ends of the earth.' But though his countenance be lifted up in wrath, and his storms strike terror into a guilty world, his beneficent hand is mercifully extended to all who prefer the sweets of religion and the purity of innocence to the empty and insignificant pursuits of thoughtless folly, or the more baneful practice of iniquity and continued dissipation.

JULY IX.

THE ANTS.

The ants, as well as the bees, may be considered as a little commonwealth, having a peculiar government, laws, and police. They live in a sort of town, divided into various streets, which lead to as many magazines. Their industry and activity in collecting and using

the materials which they want for their habitation is admirable. They all unite together to dig the earth and carry it away from their retreat; they collect a great quantity of grass, straw, sticks, &c. with which they form a heap, that at first seems very irregularly constructed, but a closer examination discovers much art and skill. Beneath the domes or little hillocks that cover them, and which are always so contrived as to throw off the water, there are passages which communicate together, and may be considered as the streets of their little city.

But what is still more remarkable is the care which the ants take of their eggs; they convey them with the utmost solicitude from place to place, nourish their young, and remove with the tenderest anxiety every thing that might hurt them. Their painful toils to procure provisions during the summer are chiefly for the preservation of their young; for the ants themselves require no food during the winter, being nearly in a state of insensibility or sleep till the return of the spring. As soon as their young come out of the eggs, the ants are busily employed in feeding them, and undergo much labour in the precious charge. They have generally several habitations, and they transport their young from one to another they may wish to people. According as the weather is cold or hot, wet or dry, they bring their chrysals nearer to the surface of the earth, or remove them farther downward. In mild weather they bring them near the surface; and sometimes after a shower of rain place them where they may receive the warmth of the sun-beams: or after a long drought they lay them in the dew; but as the shades of night deepen, or rain and cold set in, they again take up their little ones, and carry them low down in the earth.

There are several varieties of these insects: the wood-ants only inhabit forests or bushes, and do no harm to the fields; of these there are two species, one red, the other black. Some of them settle in the ground, in dry soils, generally choosing those places where they find roots of fir-trees or birch. Others inhabit old trunks of trees above ground, and sufficiently high to be out of the reach of its moisture; they make themselves apartments in the cavities of the trunk, and cover them with straw and other materials to shelter them from snow and rain.

The field-ants are also red or black, like the others, but they are smaller in size; they either live among the corn or in the soil of the field. When the weather is dry they bury themselves pretty deep; but as soon as it becomes rainy, they raise their habitations, according as there is more or less moisture, and when it diminishes they return to their subterranean dwellings. Ants are also furnished with wings, and towards the autumn they are seen to fly in swarms over ditches and ponds.

Some people may perhaps think that these mischievous ants can deserve no portion of our attention, when they do so much injury to our fields, by their subterranean works making the ground hollow, and preventing vegetables from growing. Other complaints are also

alleged against them; they are enemies to bees and silk-worms, and are supposed to injure flowers and young trees. Hence the ants are generally exterminated whenever they are found. But whatever are their powers of doing mischief, they certainly, as a link of the great chain of animal nature, claim our attention, and are worthy of our observation. They supply various birds with food, and afford a very useful example of industry, whilst their parental affection for their little ones is highly worthy of imitation. Thus we still find that every work of God is excellent and worthy of our admiration, however insignificant or injurious, upon a superficial examination, they may appear. 'The supreme Creator, by whom all things exist, has created nothing without design, nothing that has not its particular use and destination. The trees have not a leaf, the fields a single blade of grass, nor the flowers a stamen, that is useless.'

JULY X.

HAIL.

Hail is nothing more than drops of rain, which, being congealed in the air, fall in a spherical, oblong, or angular form. Should it seem strange that vapours freeze in the atmosphere during the warmest season of the year, we must consider that even at the time of the greatest heat, the upper region of the atmosphere is very cold. If this were not the case, how could the highest mountains remain covered with snow during the summer? In the hottest regions of America it is so cold on the top of very high mountains that there is a danger of being frozen, if any one is so adventurous as to climb their lofty summits; and we should have snow in the middle of summer, if it did not melt during its fall before it arrived at the ground. When the particles of snow unite, the drops begin to congeal; and as during their descent they pass suddenly through warmer regions of air, before the increase of temperature has had time to operate, they are completely frozen.

It might on the contrary be supposed, that the cold would diminish in proportion as they pass through warmer air; but what takes place in winter, when cold water which has been exposed to the open air is brought into a warm room? It freezes and becomes ice, which would not have been the case if it had been taken into a cold room. And this is exactly the case with hail; when cold bodies suddenly pass into a warm medium, their cold augments to such a degree that they are converted into ice. Saline particles diffused through the atmosphere contribute to this effect: hence we must not be surprised that storms are not always accompanied with hail; for to produce it, a quantity of saline vapours is necessary to occasion the drops of water to freeze more instantaneously. Though hail is most frequent in summer, it falls also in the other seasons; for as

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saline exhalations exist in every season of the year, there may be hail in winter, spring, or autumn, as well as in summer.

The size and form of hail are not always alike: hail-stones are sometimes round, at others concave and half spherical, and often conical and angular; their usual size is that of small shot, though sometimes they are much larger. This difference in their figure and bulk may depend upon accidental causes, such as winds, especially those which are boisterous: and a particle of hail may meet in its fall with substances with which it unites, and thus its volume become increased; and sometimes several small particles unite and form one large hail-stone.

When the hail is of a very large size, it often causes immense damage to the harvest, fruits, vines, and buildings. But this by no means entitles us to consider it as a curse or a judgment of God; for if the violence of this meteor sometimes lays waste our fields and breaks our windows, the ravages it occasions are nothing in comparison of the advantages which it produces. It cools the air during the fervent summer heats, and when it dissolves fertilizes the earth: hence we have no reason to fear its falling from the clouds, but should rather consider its beneficial consequences, and glorify that heavenly Being who, in the midst of hail and of storms, still worketh our good, and provideth for our felicity.

JULY XI.

THE UTILITY OF STORMS.

We ought always to consider the phenomena of nature in such a light as to impress upon our minds the wisdom and goodness of God; and this duty is the more indispensable, because it is often neglected by inattentive, ignorant, and ungrateful people. It is true that God sometimes makes use of natural phenomena to punish the sins of man; but these particular instances do not disprove that he always proposes and has in view the general welfare of all; and of this, nature furnishes us with abundant examples and incontestable proofs. In this day's reflection we will confine our attention to a single phenomenon, which is particularly suited to convince us of the above proposition, and upon which our ideas ought to be very clear.

Are not the greater part of mankind accustomed from early infancy to pronounce the words thunder and lightning with terror? Such is our injustice, that we only think of the extremely rare cases in which storms are fatal to a very small part of the universe; whilst we shut our eyes to the great advantages which result from them to the totality of mankind. We are not able to enumerate all the benefits we derive from storms; but the few that we are acquainted with will suffice to fill our hearts with gratitude to our heavenly Benefactor.

Let us present to our minds the idea of an atmosphere charged

with noxious and pestilential vapours, which become more and more dense by the continual evaporation from earthly substances, of which many are prutrescent and poisonous; this air we are under the necessity of breathing; the preservation or the destruction of our existence depends upon it; and thus the salubrity or insalubrity of the air dispenses life or death. Most of us have experienced a state of great oppression and languor during the stifling heat of summer; when our respiration is difficult, and we labour under great uneasiness and anxiety. Must it not then be considered as a great blessing of God, and deserving of our warmest gratitude, that a salutary storm arises and purifies the air of its noxious properties; kindles the sulphureous particles, and thus prevents their dangerous effects; cools the air, and by restoring its elasticity facilitates respiration.

Without an occasional storm the impure exhalations would be more and more increased and prejudicial; animals would perish by thousands, and an universal plague would desolate the earth. Which then is the most rational, to rejoice or repine at the presence of storms? To murmur at the slight damage they sometimes occasion, or to bless the Almighty for the precious advantages they procure to the world? Besides, not only men and animals derive much benefit from the atmosphere being purified from its noxious vapours, but it is also highly advantageous to vegetables. Experience teaches us that the rain which falls during a thunder-storm is productive of the greatest fertility to the earth. The saline and sulphureous particles which fill the atmosphere during a storm are drawn down by the rain, and become an excellent source of nourishment to plants; to say nothing of the immense multitude of little worms, seeds, and insects, which are forced into the earth by the rain, and which by the assistance of a microscope may be easily discovered in the drops of water.

Reflections like these may perhaps tend to moderate the excessive fear some people have of thunder, a fear which denotes the little confidence they place in God. Instead of suffering a storm to possess our minds with terrific and fearful ideas, let us rather accustom ourselves to consider it as an object of grandeur and sublimity; instead of regarding the accidents caused by thunder, let us only observe the necessity and great utility of storms; and, instead of praying the Almighty to withhold the tempest, let us beseech him to suffer it from time to time to descend upon the earth, or let us rather entirely rely upon the mercy and goodness of Him who rules over the universe in wisdom, and knows what is best for us. Every time the storm shall lower and the thunder peal, let us say from our hearts, in the fulness of our confidence, Almighty God! it is thou who commandest the elements, and directest the lightning; we are in thy hands; thou alone canst save; thou alone canst destroy. At thy word the storm shall desolate our fields, or make them fruitful. Thou alone art great, and thy power is inexpressible: but we are thy weak and helpless children, and thou art to us a father of mercy and of love; and when thy voice is heard in thunder, and thy countenance seen in the winged lightning, it is still for our good. Blessed for ever be thy holy name;

let all the ends of the earth raise one universal Hallelujah, the music of which shall be heard in heaven!

JULY XII.

OF THE EARTH, AND ITS PRIMITIVE CONSTITUTION.

The earth is so constituted as to be fit for the production and growth of herbs, plants, and trees. It is sufficiently compact for vegetables to grow in it, so firm that the wind does not blow them down; and yet it is so light and moveable that plants may put forth their roots in it, and attract humidity and nutritive juices. When even the surface of the earth is dry and parched, its lightness facilitates the rising of the juices in the capillary vessels to provide plants with their necessary support. Besides this, the earth is full of different kinds of juices, which tend to promote the growth of plants: and that every species of vegetables may flourish, we find there are different sorts of earth, which answer different purposes; such as potters' earth, argillaceous, calcareous, &c. Some are used to make bricks, others to construct buildings, and form earthenware and porcelain, and some are used to dye colours, and for medicine.*

The inequalities on the earth's surface are of great utility: many plants and animals inhabit the mountains; and these lofty eminences also serve to break the violence of the winds, and produce a great variety of plants and wholesome fruits which would not thrive in the valleys or on the plains; they contain useful metals and fossils, and from them proceed the sources of many rivers produced by the melting of the snow, by rains, and different watery exhalations. The stones which are in the earth serve to build walls and make glass. The uses of metals are extremely various; we need only consider the many tools they furnish to our workmen and artists, the numerous utensils and the furniture that are made of them, and the many ornaments and conveniences we derive from them. We also obtain great advantages from the solidity and weight of these bodies.

The great utility of minerals is generally known. Volcanoes and earthquakes, however they may sometimes devastate a country, are useful and necessary; and we must impute it to our ignorance if there are many things whose use we cannot discover. When we see certain phenomena in nature which are sometimes prejudicial, we should always remember that God only permits them to happen for the perfection and good of the whole; and rightly to judge of his works, we must not consider them partially, but take a wide and extensive survey of all the parts of a whole, and examine them both separately and combined. We shall then find that many things which we

* The different earths at present known are ten: barytes, strontian, lime, magnesia, alumina, yttria, glucina, zirconia, agustina, and silicia.—E.

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thought were injurious, are on the contrary of an incontestable utility; and others which appear superfluous, we should find to be necessary to the perfection of the whole, and their removal would occasion a chasm in the empire of nature. How many things are there which appear to us insignificant and of little worth, because from our ignorance we are not acquainted with their use and true worth? Give a magnet to a man unacquainted with its virtue, and he will disregard it entirely, or consider it with indifference; but inform him that by means of this little instrument the greatest quarter of the globe was discovered, and that men securely traverse the ocean with no other guide, his opinion will immediately change, and he will prize as much as he before contemned it. And this instance is applicable to thousands of cases, where we despise the means because we are ignorant of the end, where we disregard the object because we do not know its use. Lord! the earth is full of thy goodness; all is arranged with wisdom! May we consider it as our chief duty to apply ourselves more and more to know thee; and to pay thee that just tribute of gratitude and love which we owe thee for the various blessings we derive from the earth.

JULY XIII.

PHASES OF THE MOON.

It has been ascertained by attentive observation that the moon has a peculiar motion round the earth from west to east; for after having been between our earth and the sun, she retires from under that body, and continues to fall back towards the east, changing from day to day her place of rising. In fifteen days she will have reached the most eastern extremity of the horizon, at the time we see the sun set; she is then said to be in opposition: in the evening when the sun retires, she rises above our horizon; and sets in the morning as the sun rises. If she then continues to traverse the circle which she has begun round the earth, and the half of which she has accomplished, she will visibly remove more from her point of opposition with the sun, and will gradually approach nearer to him; we shall then see her later than when in opposition, till by degrees she will only be seen a little before sun-rise. This revolution of the moon round the earth explains why she rises and sets at different times, and why her phases are so diverse and yet so regular. Nobody is ignorant that a globe illuminated by the sun, or by a torch, can only receive its light immediately upon one side. We are readily convinced that the moon is a sphere which receives its light from the sun; when therefore she is in conjunction, that is, placed between the sun and us, her illuminated half is turned towards him, and her dark part towards us; consequently, at that time she is invisible to us: she then rises and sets with the sun in the same regions of the sky, and is called new moon, or the conjunction.

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But when the moon retires from under the sun, and passes back towards the east, her dark side is not then entirely turned towards us: a small portion, a slight border, of the illuminated disk comes in view; and we see this luminous border upon the right, near the setting sun; and the horns of this crescent turn towards the left, or facing the east. As the moon removes farther from the sun, she becomes more visible; and at the end of seven days, when arrived at a quarter of her course round the earth, she displays more and more of her illumined side, till at length we see the half of it. The luminous part is then turned towards the sun, and the dark part reflects no light upon us. This luminous part is exactly half the lunar sphere: the half of this half is then a quarter of the whole sphere, and is in reality this quarter which we see; and the moon is then said to be in her first quarter.

In proportion as the moon becomes more distant from the sun, and the earth advances between them, a greater surface of that part of the moon which is directed towards us becomes luminous. At the end of seven days, reckoning from the first quarter, she is nearly in opposition with the sun, and her whole disk is illumined, and visible to us. She then rises in the east precisely at the time the sun sets in the west, and we have a full moon. As early as the next day, the enlightened half is turned a little from us, and we no longer see the moon at the full. The light gradually leaves the western side, extending itself to the half which is turned from the earth: this is the decrease of the moon, and the farther she advances forward, the more her dark part increases, till at length half of it is turned towards the earth, and consequently half her luminous side; she has then the form of a semicircle, and is in her last quarter.

By the admirable harmony which subsists between the revolution of this planet upon its axis, and its course round the sun, it happens that the moon always presents to us the same half-sphere that she has shown from her first creation. During the lapse of so many ages, she has, in one regular and constant course, completed her revolution in twenty-seven days and eight hours. Regularly and at the same periods she has enlightened at one time our nights, and at another those of more distant climates.

From the revolutions of the moon, let us turn our attention to those of terrestrial objects. Sometimes health, pleasure, and affluence, with a thousand other advantages, concur to render us happy, and a luminous tract marks our progress through life. But a reverse happens: and ere the sun that rose upon us in the morning with joy and gladness sinks beneath the western ocean, our light is obscured, and nought remains but the bitter remembrance of departed pleasures; hope no more gilds our bosom, and all our thoughts are turned to sorrow. Yet this change is highly useful to the mind: it teaches us the uncertainty of worldly blessings, softens and ameliorates our hearts, and raises in our souls a fond desire after that happy country where the free mind shall rejoice in its existence, and live for ever increasing in purity and all perfection.

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JULY XIV.

MINERAL WATERS.

Whether we consider mineral waters in respect to their formation, or to their utility to man, they are doubtless highly valuable and important. But men are generally too inattentive to such subjects; and the places where these sources of life and health flow in abundance, are often the scenes of very different occupations than those of singing praises to the Creator, and pouring forth the sentiments of gratitude for such choice blessings.

The sources of common salt are richly deserving of our attention; it is probable that they owe their origin to the mineral salt which the waters dissolve in the earth. The mineral hot springs are equally remarkable. They are very numerous; and the water of some of them is so hot, that they require several hours to become cool enough to be used as a bath. It is a curious question, whence their heat is derived. It cannot be from the sun, because in that case the waters would only be hot in the day-time, whilst exposed to the sunbeams; and they would become cooler on the approach of night, and during the winter. The most natural solution of this question is, that the waters, by passing through soils containing sulphureous, pyritic, and metallic substances, acquire their great degree of heat. Medicinal waters, particularly those which are acidulous, are produced by dissolving and mixing with the minerals that they pass over. They are generally found in places where there is abundance of iron, copper, sulphur, and carbon. Hence their taste and effects are various, according as they are more or less impregnated with these bodies. They are bitter when they contain the juices of bitter roots, salts, and copper; they are cold when impregnated with sal ammoniac, nitre, alum, &c. or when they issue from the bed of a rock. Unctuous and bituminous substances impart to them a degree of oiliness; and sulphur combined with an acid renders them sulphureous. Let us then admire the inexhaustible riches of that divine goodness which has prepared for the benefit of man so many unfailing sources of health. Mineral waters may answer many other purposes, but certainly their great and chief use is the preservation and health of man. Let us, then, and more particularly those who have experienced the salubrious effects of these springs, rejoice and be thankful for the numerous blessings of Heaven; and you that are able endeavour to imitate the purest of all Beings, by making your riches the sources of life and consolation to the needy and afflicted children of poverty.

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JULY XV.

CONTINUED ACTIVITY OF NATURE IN THE VEGETABLE KINGDOM.

Whoever is desirous of knowing why Nature is never idle throughout the year, need only consider the numerous advantages that result from her constant activity. The vegetable kingdom supplies animals with a great part of their food, and affords the mind pleasure by its great diversity. The beneficent Creator ordered that nature should conduce to the pleasure as well as the support of man: hence plants do not appear all at once, but in a certain succession; for if this was not the case, they could not produce such beneficial consequences. How would men be able to secure their harvests, if all fruits arrived at maturity in the same season? And what would become of many millions of animals that had not the means of laying up stores? How could the numerous species of insects that live upon flowers exist, if they all grew at the same time, and lived but for a month or two? For though many insects cannot be found during the winter, they still live in a torpid state, and come forth as soon as the returning warmth renders them lively.

It is then very clear, that if nature was differently arranged, both men and animals would materially suffer, if not entirely perish; and we may justly conclude that it is for their preservation that nature operates with such a constant activity in the vegetable kingdom.

If we reflect upon the pleasures of vision and of smell, which men so eminently enjoy, we shall also find that to promote these it was necessary that nature should have her present arrangement. It was not only requisite that she should display her flowers in all their beauty, but also that she should afford a constant supply throughout the year, that our enjoyment might never cease. In spring, when we go forth into the country to contemplate the different productions that are growing up for our future nourishment, we see the young buds and the trees gradually unfolding their beauties. As summer advances, and the tender corn begins to shoot into ear, a thousand beautiful flowers mingle their charms in a sweet succession of varied gayety; and at length, when the wintry blast blows cold, and makes the fireside comfortable, nature produces other vegetables, which, though not so striking to the sight, are still very useful.

From all this it appears that the chief design of the Creator in this happy arrangement of nature, is the advantage and well-being of man. Every thing is so admirably regulated, that men, as well as other animals, gain an adequate supply of nourishment. Every season brings forth its peculiar flowers and fruits, each appearing in its appointed time: as one gradually decays and perishes, another comes forth in youthful beauty; and the many thousands of plants which we see all follow the same law. Every thing that bears the stamp of God's creation, is formed in the same regular and wise order,

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though the weakness of our intellect sometimes prevents our discovering their real purpose and design.

Let us then for ever bless our Creator, and render unto him all glory and honour; acknowledging in humble reverence and with grateful hearts, that in all the revolutions which agitate the vast empire of nature, whether in the animal or the vegetable creation, He proposes only our good, and more perfect happiness; and then when we joyfully walk abroad into the flowery meads, and contemplate nature's ever-varying beauties, we shall only breathe the language of gratitude and love, and our souls will approach nearer to the purity and ethereal essence of the all-perfect God.

JULY XVI.

BEAUTY AND USE OF MEADOWS.

The sight of a fine and well-cultivated garden, in these summer days, is highly pleasing, and forms a gratification of which those people who remain shut up in their houses can have no conception. But to the true lover of nature, a regular and beautifully disposed garden has no charms equal to those of the valleys smiling in rustic simplicity; the proudly-bearing tulip, the elegant narcissus, and the beauteous hyacinth, must yield to the sweet little flowers that modestly raise their heads amid their native fields. Whilst the former only please by their beauty, these often combine with simple charms an evident utility, which continues to gratify when beauty is no more. Do we not, in those long and straight gravel walks, so uniform and neat—in those clumps of trees, those arbours and beds of flowers so regularly formed, and borders neatly cut, with high walls and enclosures surrounding all—feel a degree of confinement that is irksome, and restriction that is unpleasant? Whatever limits our view seems to set bounds to our liberty, and we long to range abroad in the open fields and meadows, where no dead wall shall obstruct our prospect, nor uniform enclosure pain our sight. In proportion as our range of nature is wide and extensive, our independence seems to increase, and we delight to roam at ease, in careless thought or in musing contemplation.

The beauties of a garden are soon observed, and when their novelty is over, half their charms are lost: the eye becomes weary of surveying the same objects; little pleasure can be derived from continually viewing the uniformity of shrubs ever seen in the same place, or contemplating plants whose variety may be explored in an hour; we pass up one walk and come down another, and if we cannot discover a third, measure back our steps, and are not sorry when we are permitted to retire: whilst in the open champaign the aspect of nature is ever changing, the eye fondly stretches far on the horizon's distant boundary, and when the lawn can no longer be distinguished from the

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sky, imagination lends her aid, and we dwell with rapture upon a picture which art cannot imitate. Our pleasure is farther increased by that inequality of surface which we every where observe throughout nature; from the stupendous mountain's crag, where the bleak wind whistles, to the sheltered valley. She is her own gardener, and is never weary with labouring; her seeds and fruits are exhaustless, and her verdure is only interrupted to return with fresher beauty; her streams overflow and renew the parched and drooping herbs, and each of these has a seed, blossom, and beauty, peculiar to itself. For though the same species of herb may be very abundant in every field, we can scarcely step without meeting with a great variety differing in figure and properties, and presenting us not merely with beauty and diversity, but also with very great and indispensable benefits. The fields produce plants for our nourishment when we are well, and for our relief when sick. They also support those animals whose use we could not dispense with: such as the ox, upon which we feed, and whose services are used in agriculture; the horse, whose uses are so numerous and various; and the cow, whose milk is so nourishing. These, with many other useful animals, require nothing more than the grass of the meadow, which demands neither sowing nor labour; its produce is certain, and the farmer has no other trouble than to collect what nature exuberantly gives him.

But it is melancholy to reflect that men are generally too much absorbed in worldly cares to be attentive or sensible to the bounty of God lavished in nature; they see with indifference the fields clothed with grass; whether because springing up under their feet they think it unworthy of notice, or because it grows spontaneously without their assistance. Whatever be the cause of this indifference, it is a reproach to the human character, and deserving of the severest reprehension. Let us then beseech the Almighty Power, to whom we owe all our earthly good and hopes of future bliss, that when we walk forth into the meadows and the valleys, our hearts may be grateful, and softened with the dew of heaven; that when we behold all the beautiful variety of flowers that adorn the fields, we may be more sensible to the goodness of God, who extends his omnipotent arm over the whole creation, showering down his blessings as from a never-failing, never-dying spring, whose silent waters exuberantly pour upon the whole earth.

JULY XVII.

MORNING TWILIGHT.

Twilight, like every other phenomenon of nature, is doubtless intended for our benefit. It is nothing more than a prolongation of day, which at one time prepares our eyes to support the brilliancy of day, at another to bear the darkness of night. The twilight is not always

the same; it differs according to climate and season. Towards the poles it continues longer than in the torrid zone, where the people see the sun rise directly above the horizon, and dip in the same direction beneath the lower hemisphere; hence they suddenly pass from the light of day into total darkness. Whilst, on the contrary, the sun darting his rays obliquely towards the poles, and not descending far below the horizon of the neighbouring people, it happens, that their nights, though long, are almost always accompanied by twilight, and therefore are in some degree luminous.

As for us, who are placed at nearly an equal distance from the inhabitants of the torrid and those of the frigid zone, we plainly observe that the twilight becomes sensibly shorter as the length of the days diminishes, and longer in proportion as they lengthen. In the evening, after the sun sets, we enjoy an hour, and sometimes more, of twilight. This useful arrangement is owing to the atmosphere, which to a certain height every where surrounds the earth. And such is its nature, that the rays of light that pass through it perpendicularly are not diverted from their straight direction; but when the rays fall obliquely instead of passing in right lines, they bend or are refracted, descending a little lower, in such a manner that the greater number of rays which penetrate the atmosphere on the side of the earth, fall in consequence of this inflection upon it; and thus, instead of passing directly through the air, they are bent by it and directed towards the earth. Thus when the sun approaches our horizon, many of his rays which pass near us in an oblique direction, and which would not reach us, meeting the volume of air which surrounds our earth, become refracted by it, so as to affect our vision in such a way that we see daylight some time before the sun appears.

This law of the refraction of the rays of light in the surrounding mass of air, is a work equally full of wisdom and goodness towards all the people of the earth; and more particularly so to the inhabitants of the frigid zones, who without the blessing of twilight would be for whole months in a state of total darkness. Perhaps this explanation of the origin of twilight may not be sufficiently intelligible to many readers. Recommending such as these to consult the works of more enlightened philosophers for fuller information on the subject, let us conclude with reflecting upon it as rational beings and as Christians. To do this nothing more is requisite than a willing mind and a pure heart, that seeks to glorify the Father of mercy. And the upright man who, however unlettered and deficient in learning, ever finds cause to bless the Creator in his works, is wiser than the philosopher who, intent upon explaining and investigating the phenomena of nature, loses sight of that great Being who created the light and formed the universe.

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JULY XVIII.

RURAL PLEASURES.

Come, and let us enjoy those pleasures which are only tasted by the wise. The pure light of the sun invites us into the fields, where an innocent and refined joy awaits us. Let us walk into some flowery valley, and sing a hymn of praise to our Creator.

See the breath of the zephyr gently playing upon yon hawthorn bush: where the little songsters are hopping from bough to bough, their sprightly eyes beaming joy, and their soft melody warbling harmonious love!

Ye tufted groves, ye valleys, and ye mountains, so peculiarly favoured with the gifts of summer, how your view gratifies and delights the pure soul! your attractions owe nothing to art, and they are more excellent than the proudest beauties of the garden.

The yellow grain waves luxuriant, and invites the sickle of the joyful reaper. The trees crowned with leaves overshadow the hills and the glens; the birds rejoice in their existence; they sing their pleasures, and every note pours forth rapturous joy.

Each year renews the treasures of the peaceful husbandman; freedom and the smile of happiness lighten his serene countenance, that speaks a soul at ease. Remote from the iniquity, the pride, the baseness, and sordid cares, which enslave and render callous the hearts of those who herd together in cities, he rises to inhale the sweet breath of morning, and lies down upon his humble couch at peace with his God, himself, and mankind.

JULY XIX.

EVENING TWILIGHT.

The evening twilight is that faint light which after sunset continues still to illumine our atmosphere, particularly towards the west. It is partly occasioned by the refraction and reflection of the sun's rays in our atmosphere, and in part by the proper atmosphere of the sun, which is known by the names of zodiacal light, which sometimes appears, particularly in spring, towards the evening, and in autumn, towards morning. When the sky is clear we may see the smallest stars during the twilight; which continues from the time the sun has entirely disappeared till dark night, generally lasting about two hours. In the island of Senegal, where the nights are nearly as long as the days, the twilight only continues a few moments; the interval between sun-set and the darkness of night being scarcely a quarter of an hour. Thus as soon as the sun has sunk from ten to fifteen degrees

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below the horizon, the whole country is immersed in the profoundest darkness.

In our climate the shortest twilight is about the first of March and the eleventh of October. When the northern declination of the sun is such that he only passes eighteen degrees below the horizon, the twilight continues all night. And this is the reason that in the summer solstice we have in these climates scarcely any night, and in the more northern climates they have no night at all, though the sun is below the horizon. This occurs, when the difference between the depression of the equator and the northern declination of the sun is less than eighteen degrees; and takes place in the greater part of Germany from the 17th of May to the 25th of July.

The advantages which we derive from twilight are very evident. To pass at once from broad day to dark night would be very inconvenient; such a sudden change from light to darkness would hurt the organs of vision. The wise Author of nature has therefore prevented these inconveniences, by giving us an atmosphere which prevents us from losing the light suddenly, although the sun is below the horizon; and thus, by means of the twilight, we pass by insensible degrees from the light of day to the obscurity of night.

JULY XX.

THE EPHEMERON FLY.

This species of insect is named ephemeron, because of its very short existence in the fly state. It is one of the most beautiful species of the small flies, and undergoes five changes. At first the egg contains its vital principle; it then comes forth a small caterpillar, which is transformed into a chrysalis, then into a nympha, and lastly into a fly, which deposits its eggs upon the surface of water, where the sun's rays bring them to life. Each egg produces a little red worm, which moves in a serpentine manner. They are found in abundance, during the summer, in ponds and marshes; and as soon as cold weather sets in, the little worm makes for itself a shell or lodging, where it passes the winter; at the end of which it ceases to be a worm, and enters into its third state, that of a chrysalis. In this state it sleeps till spring, and gradually becomes a beautiful nympha, or a sort of mummy, something in the form of a fish.

At the time of its metamorphosis the nympha appears inactive and lifeless; in six hours the head is visible, raising itself gradually above the surface of the water; the body next disengages itself slowly and by degrees, till at length the whole animal comes out of its shell. The new-born fly remains for some minutes motionless upon the water; then gradually revives, and feebly shakes its wings; then moves them quicker, and attempts first to walk, then to fly. As these insects are all hatched nearly at the same time, they are seen in

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swarms for a few hours flitting and playing upon the surface of the water. The male and female then unite and couple together for two more hours, when they again return to their sports, lay their eggs, and soon after die. Thus they terminate their short life in the space of a few hours, and the same day that saw them born witnesses their death.

From the history of these little creatures we may learn how fallacious are the opinions which we form of our lives in regard to eternity. Let us for a moment imagine, that one of these flies had preserved its life for twelve hours, and had thus arrived at the most advanced age, compared with its companions, most of which had died at noon. If this aged insect could speak about sunset, a little before its death, it might thus address its friends: 'I now find that the longest life must terminate. The period of my dissolution is at length arrived, and I regret it not; my very old age is become troublesome, and I can no longer discover any thing new beneath the sun. All that I have seen in the course of my life has convinced me, that nothing here is certain or permanent. I have lived in the first ages of the world; I have conversed with insects far superior to those of the present generation. I assure you that I have seen this sun, which is now so near the earth, in the midst of the sky. In those days his light was much more vivid than it now is; and our ancestors were much more sober and virtuous than we are. I have outlived my contemporaries, have had large experience, and have witnessed many strange events. My life commenced precisely when the sun rose. During countless years it ran its majestic course through the heavens, and every where diffused an intense heat; but now that it is declining and going to set, I perceive clearly that the end of all things is approaching. O my friends, how I once fondly hoped that my life would be eternal! What beautiful little cells I formed for my abode! What hopes I founded on my vigour, my agility, and the strength of my constitution; I thought my wings would never fail!'

Thus might an insect, which has lived nearly twelve hours on the earth, moralize. And a man who has passed nearly fourscore years in the world may adopt similar language. The difference between twelve hours and eighty years being nothing in reference to eternity.

JULY XXI.

DIVERSITY OF ZONES.

The figure of the earth being spherical, and having a double motion, it necessarily follows that its different regions vary from each other, both as to the temperature of the air and the seasons, as well as with regard to the animals and plants which they produce. In certain countries of the globe there is but one season; the summer continuing without cessation, and every day being as warm as the hottest of our summer days. These countries are situated about the middle of

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the globe, and occupy the space called the torrid zone. The most delicious and odoriferous fruits that nature produces grow there and there also she has lavished her richest treasures. In this zone the days and the nights are of an equal length during the greatest part of the year.

There are countries, on the contrary, where an intense degree of cold, exceeding that of our severest winters, almost constantly prevails; and it is only during a few weeks out of the whole year that there is heat enough for the few trees and herbs that are found in those regions to grow and become green; but neither the trees nor the earth produce fruits which will nourish man; and in these regions there is the greatest length of day and night, each being of several months' duration.

The two temperate zones, situated between the torrid and the frigid zones, occupy the greatest part of our globe. In these countries there are four seasons, more or less distinct according as they approach nearer to the torrid or to the frigid zone. These seasons are, the spring, when the trees and plants put forth their buds, the heat is moderate, and the days and nights nearly equal; the summer, during which the fruits of the fields and of the trees are ripened, the heat powerful, and the days sensibly longer than the nights; the autumn, when the fruits and the seeds fall, the grass begins to wither, the heat to diminish, and the days and nights to be equal; the winter, when the vegetation of plants is partially or wholly suspended, the nights are lengthened, and the cold is more or less intense.

The countries of the temperate zones are so situated, that in those which border upon one of the sides of the torrid zone, the seasons occur in order quite opposite to that which obtains in the other temperate zone; for when it is winter in the one, it is summer in the other. It is in these regions that nature seems to have produced the greatest diversity, both of animal and vegetable productions. Wine is peculiar to those countries, for the vine cannot be cultivated where either the heat or the cold is excessive. The inhabitants of these temperate climates enjoy advantages greater than in any other country: for the people inhabiting the frigid zone are stupid, and of short stature; those of the torrid zone are of a more feeble temperament, have stronger passions, and less intellectual and bodily powers, than the inhabitants of the temperate zones.

However diversified the countries of the globe may be, the Creator has provided, by his wise arrangements, for the happiness of all their inhabitants. He makes each country produce that which is most beneficial and proper, according to the nature of the climate. A worm which feeds upon the leaves of the mulberry tree, spins for the people of the torrid zone a tissue with which they prepare the silken garments which they wear. And a tree, like a shrub, bears a kind of pod or husk, containing a very fine wool or cotton, with which light stuffs are manufactured. The cold countries abound with quadrupeds, whose skins furnish clothing to the inhabitants of the north, who also enjoy extensive forests which abundantly supply them with

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fuel. The natives of the south possess in their fields and their orchards the most cooling and exquisite fruits, and in such abundance that they are able to supply other countries with large quantities. In the colder regions the want of fruit is supplied by the numerous fish contained in the seas and the lakes, and by the numerous animals with which the country is inhabited: some of which, roaming wild in the forests, affright the neighbouring inhabitants; but they are still highly valuable for their skins, and many of them as articles of food and convenience.

Thus there is no country of the globe that does not receive proofs of the greatness and goodness of God; no country so poor and steril as not to furnish its inhabitants with the means of subsistence and the comforts of life; and we must every where acknowledge the traces of divine goodness: even the vast trackless deserts and craggy mountains of Asia and Africa declare it, and contain monuments of eternal wisdom and unbounded love. From the frozen climes of the north, where ice and snow for ever dwell, hymns of praise to the most high God rise and blend in harmonious unison with the tuneful incense as it ascends to heaven from the more temperate regions. By every tongue, language, and people, the name of God is manifested, revered, and joyfully sung: and let us, the inhabitants of a country peculiarly favoured by Heaven, be as distinguished among the nations of the earth for piety and good works, as we are for arts, sciences, and commerce.

JULY XXII.

PECULIARITIES OF THE SEA.

Instead of looking upon the sea as an object of terror, let us consider the wonders and the benefits which it presents to us. It must be granted that when the waves swell into mountains, and the tempest roars, the prospect is awful; and we must be hardy indeed not to consider it as a most formidable element in such times of fearful visitation, when ships, breaking from their anchors, or driven from their course, rush before the winds that beat upon them with ungovernable fury, till dismasted, and their rigging shivered in fragments, they sink overwhelmed with a weight of waters, or strike some sand-bank or shelving rock, and are at once dashed to pieces. Sometimes whirlpools, or vast masses of water with a violently circular motion, whirl the unfortunate vessel that fate urges into their vortex, with irresistible force, till the helpless victim sinks within the tremendous gulf, and the cries of the unfortunate wretches are lost in the roar of the waves. These whirlpools are occasioned by rocks in the ocean, and the meeting of numerous currents and eddies: and not less dangerous are the water-spouts, that the wind raises from the sea to the clouds; they hover in the air high above the ocean, and the wind

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whirls them round with violence. They often burst with a great crash and much mischief; for they fall upon a vessel, destroy its rigging, and sometimes sink it to the bottom.

But it would be highly ungrateful and unjust only to consider the losses occasioned by the sea, without reflecting upon the magnificent and stupendous works of God, and that goodness which even visits the unfathomable depths of the ocean. The first thing which strikes us upon the investigation of sea-water is its saltness; a pound of the water containing about two ounces of salt. Sea-salt is lighter than that we commonly use, and yet it is not attracted by the air, nor diminished by the continual influx of fresh water. The cause of the saltness of the sea is unknown. If it was from mountains of salt contained in the ocean, it would be salter in some places than in others, of which we have no proof. But whatever is the occasion of the saline property of the sea, it is absolutely necessary to accomplish certain ends. It is that which preserves such a vast body of water from corruption, and renders it capable of supporting a greater weight.

The colour of the sea also merits our attention: it is not every where alike. In all waters the colour of the bottom and that of the sky appear; they are dark in deep abysses, white and foaming during a storm, silvery and gilded with reflections of the most beautiful hues when the last rays of the setting sun play upon the unruffled surface; the colour of the sea, in addition to these, varies from numberless insects, marine plants, and the combination of the different substances which the rivers and torrents carry with them into the ocean. When it is calm, and not a breeze skims the surface, it sometimes glitters as with the most brilliant stars; and the track of a ship cleaving the waves is often luminous, seeming like a river of fire.

A well-known property of the sea is the ebbing and flowing of the tides.*

The creatures which inhabit the sea are well calculated to excite our surprise and admiration; we there discover a new world, and the number of beings which compose it is prodigious. Aquatic animals are not so numerous in their species as the land animals; but they surpass them in size and longevity. The elephant and ostrich yield in bulk to the whale, the largest fish of the ocean, its length being often from sixty to seventy feet; it lives as long as the oak, and no land animal can vie with it in length of life. If we may rely upon certain accounts, there are creatures in the ocean far exceeding the size of the whale; as the animal called kraken, said to exist in the northern seas, and whose circumference is half a German league. Who can number the different species of animals which people the seas? Or who can determine their form, structure, size, and properties? How infinitely great is that God who has created the sea will be the conclusion of all who investigate the subject.

It is not without the wisest reasons that the Creator has made the

* See Reflection of Feb. 7.

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ocean and the seas to occupy two-thirds of the whole globe. The seas were not only to form great reservoirs of water, but by means of their evaporation to be the sources of rain, snow, and various meteors. What wisdom is displayed in the connexion which the seas have with each other, and in their continual motion! And it is not less wonderful that the bottom of the ocean is nearly of the same nature as the surface of the earth. There are found in the sea, rocks, caverns, plains, springs, plants, and animals; and the islands are only the summits of a long chain of mountains. When we consider that the seas form a part of the globe the least investigated, we are disposed to believe that they contain many more wonders, which neither the senses nor the understanding of man have yet been able to penetrate, but which all testify the adorable wisdom and power of the Most High. To him then who has established the monuments of his grandeur and the sceptre of his glory in the ocean as upon the earth, be ascribed all admiration and praise!

JULY XXIII.

DIFFERENT SHADES OBSERVABLE IN FLOWERS.

With a heart beating with joyful emotions I look round and see all the beauties of the creation. How lovely are the tints! how pleasing their combination! How admirable the diversity of shades! Here the colours are exquisitely touched with the lightest pencil: there they arrest the eye by their brilliancy and deeper glow. The ground-colour is always such as to show the picture stretched upon it to the most advantage; whilst the green surrounding the flower, or the shade of the leaves, gives life to the whole.

In thus distributing and diversifying the colours, nature has procured us the most agreeable sensations. How great and numberless are the works of God; how wisely arranged! We cannot sufficiently admire the grandeur of his designs, the magnitude of his views, nor the wisdom he employs in their execution. It is only with labour and incessant toil that men can accomplish any single work; and after many fruitless efforts, at length sometimes succeed so as to imitate some one of nature's works. But the Supreme Power, the immortal God, in a single moment has given life to millions of beings, and has created them in perfection according to their different states and degrees. The more we examine the works of art, the more will their imperfections appear; while for near six thousand years the works of nature, formed by the infinite hand of God, have been contemplated with increasing delight, without a single error being discovered in the plan, or any thing suggested that could render the execution more perfect. The more we investigate the works of God, the more their beauty delights, and their perfection pleases; whilst our love and veneration for their Divine Author increases.

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Flowers are particularly pleasing by their simplicity. One single element, under the forming hand of nature, assumes all this beautiful variety. The moisture of the earth and air insinuates itself into the vessels of plants, and filters through a series of transparent tubes; and this is the cause of all the beauties which we observe in the vegetable kingdom. If each colour had its particular cause, the surprise of the beholder might not be so great: but we contemplate with delight, and are never weary of admiring as the effect of supernal wisdom, a work, which, so diversified in its parts, is nevertheless perfectly simple as to its cause; by which we see a number of effects depending upon a single spring, always acting in the same manner.

Whilst viewing with rapture the beautiful variety of colouring displayed in flowers, we must necessarily feel the value of that reason which we enjoy as beings endowed with immortality, without which in vain would the charms of nature unfold to our senses. With the light of reason we are able to know and distinguish the numberless beauties of flowers, to appreciate the infinitely varied blending of their tints, and all the delightful scenery of the meadows, valleys, forests, and mountains; making them contribute to our pleasures, and finding in each evident traces of an Almighty God. Father of light and mercy! Parent of good! What can we render unto thee, or how can we sufficiently thank thee, for that choice and pure gift of reason which elevates our souls from earth to heaven, and raises us from the nature of brutes unto the dignity of angels?

JULY XXIV.

SUMMER HEAT.

At this season of the year we generally experience the greatest degree of heat; though the sun, having now entered into the sign Leo, daily removes farther from us. When we were nearer to him the heat was temperate; and now that we are farther off it is at its greatest degree of fervency. The reason of this is from the peculiar arrangement of our globe. The sun was lately nearer to us; but as his rays had not sufficient force to penetrate deep into the earth, we only felt a temperate degree of heat; but in the space of some weeks, the earth, and the bodies which cover it, are so much heated, that even the least influence of the sun produces more effect than at the beginning of summer, when it acted upon cold bodies.

Some people murmur at this arrangement of nature, and complain of the intenseness of the heat, which renders them incapable of bearing much fatigue; but to repine at an arrangement founded upon the immutable laws of nature, and consequently an inevitable effect of certain causes, is failing in gratitude to our Heavenly Father, by censuring his government, which never fails in the end to promote the general welfare of the world. And to repine because one day is

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hot and another cold, one wet and another dry, bespeaks a weak head and a bad heart. If these heats were not sometimes to occur, how could the fruits which are to nourish men during the winter arrive at maturity? Thus all our murmurings at the decrees of Providence, who always out of evil worketh good, are the offspring of folly and of ingratitude. Though the inhabitants of the western part of Africa, and particularly of Cape Verd and the island of Goree, are exposed during the whole year to the most intense heat, their bodies are so organized that they can endure it without suffering in their health; and the winds continually blowing over the country temper and cool the air.

And has the Creator been less bountiful to us? Is it not from his tender cares that the summer nights cool the air, and produce a delightful freshness? A single night revives the languishing plants, gives new vigour to the enfeebled animals, and enables us to sustain the fatigues of the day with alacrity. Even the storms which cause so much fear are, in the hands of God, the means of purifying the air, and refreshing the creation. And we have a variety of deliciously cooling fruits, that tend to preserve our health at this season. Let us then no longer complain of the sun's heat, nor of the sufferings that we endure; but consider them as a part of the divine plan, and as being alleviated by a thousand means that ought to excite our gratitude and adoration.

JULY XXV.

OF SOME REMARKABLE PROPERTIES IN ANIMALS.

Of all parts of nature the animal kingdom presents us with the most curious subjects of investigation; and to the lover of natural history the different instincts with which animals are endowed form a highly interesting study. To a reflecting mind it is not merely a pleasing amusement; the properties of animals cause us to look up to a wisdom which we cannot penetrate, and which surpasses all human conception. And this effect I wish to produce in my readers, by pointing out to them the singularities observable in certain animals.

The manner in which birds and insects lay their eggs is worthy of admiration. The grasshopper, the lizard, the tortoise, and the crocodile, neither trouble themselves about their eggs, nor about their young when hatched. They deposit their eggs in the ground, and leave them to be hatched by the heat of the sun's rays. Other species of animals, by natural instinct, lay their eggs in places where their young can find a sufficiency of food as soon as they are hatched. This instinct never deceives them. The butterfly of the herbivorous caterpillar will never lay her eggs upon meat, neither will the flesh-fly lay her eggs upon vegetables. Some species of animals have so much solicitude for their eggs that they carry them with them wher-

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ever they go. The spider called the wanderer carries her eggs in a little silken bag. When they are hatched, they range themselves in order upon their mother's back, who travels about with her load, and continues for some time to take care of them. Certain species of flies deposite their eggs in the bodies of living insects, or in their nests; and we know that there is not a single plant that does not serve to lodge and feed many insects. A fly pierces the leaf of an oak, and deposites its eggs in the hole it has made; the wound soon closes up, the part swells, and an excrescence or tuberosity appears, called a gall: the eggs that have been enclosed within it grow in size, and the insect which they produce finds in its resting-place suitable aliment.

The care which animals take of their young is almost incredible; and their love for them is often greater than for their own lives. How assiduously some quadrupeds nourish their young! When wounded, they cure them by licking them with their tongue; they carry them from one place to another; when dangers threaten, they keep near to defend and guide them. If they are carnivorous, how carefully their dam procures them flesh, teaches them to pursue their prey, to play with it when in their power, and then to tear it to pieces! We cannot read without emotions of grief, and feeling sentiments of horror and detestation rise in our bosoms, the account of a bitch, which, whilst they were dissecting alive, continually licked her young ones, as if to solace her affliction, and mitigate her torture by this maternal gratification; and when this last consolation was denied by taking away her young, she uttered a piercing and most lamentable cry.

Some sea-animals during a storm shelter their young under their belly. Each species of animals has its peculiar wants and desires, for both of which the Creator has abundantly provided. Let us take for example those creatures which seek their nourishment in the water; and among these the water-fowl. Nature has furnished their feathers with an oily matter, through which water cannot penetrate: by this means they do not become wet in diving, which would impede their flying. The proportions of their bodies also differ from those of other birds. Their legs are placed more behind, to enable them to stand up in the water, and more readily to expand their wings. That they may swim with ease, their feet are provided with webs; to facilitate their diving, their body is peculiarly formed; and to enable them to seize their prey, they have a long neck and a large bill: in short, nature has completely formed them for their particular mode of living.

The nautilus is a shell-fish something resembling the snail species; when they wish to ascend, they place themselves in front of their shell, and to render it more light, empty out the water through an opening. When they wish to descend, they retire to the bottom of their little house, which filling with water, becomes heavy and sinks. If they wish to sail, they skilfully turn their shell, which becomes a little gondola, and they stretch out a thin light membrane, which

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swells before the wind, serving as a sail; and perhaps it might be this little nautilus that first taught men the art of sailing.

It is the same with the actions of animals as with their structure. The same wisdom which has formed their body has constructed their limbs, and appointed them their use; has also regulated the different actions that they perform, and directs them towards the end proposed in their creation. The brute is guided by the invisible hand of the Creator, and produces works which excite our admiration, and seems to be actuated by reason. It ceases to work when necessary, regulates its labour according to circumstances, and yet only follows certain secret springs that make it move. It acts as a machine which cannot judge of the work which it executes; and is directed by the adorable wisdom of the Creator, who has placed each insect, as he has each planet, in a sphere from which it cannot deviate. When I observe then the different instincts and industry of animals, my soul is filled with veneration, and I seem to see the immediate operation of a Divine Power, which is only visible by its wonderful effects; and whoever attentively considers the different works of nature, must every where discover the evidences of God, and abundant cause to love and admire his sempiternal wisdom and goodness.

JULY XXVI.

THE HUMAN COUNTENANCE.

The external appearance of the human body at once declares the superiority of man over all living creatures. His face directed towards the heavens, prepares us to expect that dignified expression which is so legibly inscribed upon his features; and from the countenance of man we may judge of his important destination and high prerogatives.

While the soul enjoys undisturbed tranquillity, the features of the face are calm and composed; but when agitated by emotions, and tossed by contending passions, the countenance becomes a living picture, in which every sensation is depicted with equal force and delicacy. Each affection of the mind has its particular impression, and every change of countenance denotes some secret emotion of the heart. The eye may in particular be regarded as the immediate organ of the soul; as a mirror, in which the most tumultuous passions and the gentlest affections are reflected without disguise. Hence it may be called with propriety the true interpreter of the soul, and organ of the understanding. The colour and motions of the eye contribute much to mark the character of the countenance. The human eyes are in proportion nearer to one another than those of any other living creatures; the space between the eyes of most of these being so great as to prevent their seeing an object with both their eyes at the same time, unless it is placed at a great distance.

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Next to the eyes, the eye-brows tend to fix the character of the countenance. Their colour renders them particularly striking; they form the shade of the picture, which thus acquires greater force of colouring. The eye-lashes, when long and thick, give beauty and additional charms to the eye. No animals, but men and monkeys, have both eye-lids ornamented with eye-lashes: other creatures having them only on the lower eye-lid. The eye-brows are elevated, depressed, and contracted, by means of the muscles upon the forehead. The lids are of use to defend the eye, and prevent the cornea from becoming dry.

The forehead forms a very considerable part of the face, and when well formed adds much to its beauty: it should neither project much, nor be quite flat; neither be very large, nor yet small; fine hair adds much to its beauty.

The nose is the most prominent and least moveable part of the face; hence it adds more to the beauty than the expression of the countenance. The mouth and lips are on the contrary extremely susceptible of changes; and if the eyes express the passions of the soul, the mouth seems more peculiarly to correspond with the emotions of the heart. The rosy bloom of the lips, and the ivory white of the teeth, complete the charms of the human face.

Without considering the several uses of these parts, we have ample testimony of their divine origin; and in contemplating the beauty of the human countenance, our admiration increases in thinking of that Being by whose wisdom and goodness we are so exquisitely formed. Whilst we examine each feature, let us meditate upon those high prerogatives which we enjoy over the animal world, and upon the noble purposes for which we are created. Our eye commands the face of nature, and glances from earth to heaven; our lips dance to the music of hymns in praise of our God; and every feature of the mind-illumined face displays that goodness of heart, and purity and intelligence of soul, which amiable modesty, retiring from the gaze of men, in vain attempts to conceal.

JULY XXVII.

GRAVITY OF BODIES.

All bodies possess a force which acts at all times, in all places, and in all directions. If a body attempts to move more forcibly towards one point than to another, it is said to gravitate towards that point. Experience teaches us, that bodies have a tendency to descend; or that if they are from the surface of the earth without being supported they fall down perpendicularly. It is not in the body itself that we must seek the cause of its gravity; for a body which falls remains in the state in which it was first placed, till some external cause changes its direction. It is equally impossible that the air should be the cause

of this gravity; for, possessing weight itself, it would rather retard the velocity of falling bodies. We must, therefore, look for the cause elsewhere. Perhaps the opinion approaching nearest to truth, is that which supposes the earth has the property of attracting bodies placed at a certain distance. Or perhaps we may impute the cause of gravity to some foreign matter distributed through all bodies.

But though we cannot exactly ascertain its cause, nothing is more clear than the advantages which result from it. Without the power of gravity we should not be able to move as we do. Our centre of gravity is about the middle of our bodies; when we raise the right foot, we must bear this centre upon our left. If we bend our body forward, we are in danger of falling; but, by extending our right leg, we prevent our fall and make a step. Thus our walking is in some measure a continual series of interrupted falls. Hence, when we ascend a hill, we bend our body forward; and backward when we descend. In carrying a burden on our shoulders we incline forwards, and lean back when we carry it in our arms. All this proceeds from the laws of gravity, which regulate the motions of animals, when they walk, swim, or fly.

The same laws are also extended to the heavenly bodies. The sun attracts the planets, and each planet attracts its satellites; or, what is the same thing, the planets gravitate towards the sun, and the satellites towards the planets; for a body made to revolve in a circle would always fly off from the centre in a right line, if it met with no obstruction. The planets revolve in their orbits with the greatest velocity. It seems as if a motion as rapid as that of the moon should whirl her from us to an immense distance in the immeasurable space, if there was not force which continually impelled her towards our globe, and which was strong enough to counteract the force tending to propel her from the earth. And this force is the gravitation of the moon towards the earth. If our earth was either lighter or heavier than it is, it would approach too near to, or fly off too far from, the sun: in the one case, nobody could support the heat; in the other cold would be equally unbearable: either every thing upon the globe would be consumed by heat, or frozen by excess of cold.

Here again we have fresh cause to admire and adore that Wisdom, which, by means apparently so simple, regulates the motions of animals, and wields the vast globes that roll in the firmament. By the laws of gravity alone the smallest particles of dust are prevented from being lost, either from our earth, or from any of the globes which continually revolve around us. We here see the greatness of that power and wisdom which produce the most astonishing effects by means which appear to us the most insignificant.

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JULY XXVIII.

MANY EFFECTS IN NATURE PROCEED FROM THE SAME CAUSE.

Universal nature is an endless chain of causes and effects; and as all parts of the universe bear a relation to each other, every motion and every event depends upon a preceding cause, and itself becomes the cause of effects which follow its action. The whole constitution of the world is well calculated to convince us that it is not chance, but a divine Wisdom surpassing all conception, which first erected this wonderful edifice, impressed motion upon its different parts, and determined the great chain of events to depend upon and succeed each other with order and regularity. It is not difficult to acquire this degree of knowledge; for though our acquaintance with nature is very limited, we yet are able to perceive that many important effects depend upon causes evident to human intelligence. As a proof of this we may instance many natural phenomena.

What a variety of effects are produced by the heat of the sun! It not only contributes to the life of an innumerable multitude of animals, but also to the vegetation of plants; to the ripening of seeds and fruits; the fluidity of water; the elevation of vapours; and to the formation of clouds, without which we should have neither rain nor dew.

The air also is so constituted as to answer various ends. By means of this element, animals are preserved alive, and all the vital functions performed with vigour. It is by means of the air that the fire burns, and combustion is supported; that sound is conveyed in undulations to the ear; that winged creatures fly from place to place; and that man traverses the vast extent of the ocean. It is the air which supports the clouds, till, becoming too heavy, they fall in rain; it is that which prolongs our day by means of the twilight; and without air the gifts of speech and of hearing would be useless. All these, and many other advantages, depend upon the air in which we live and breathe. Is not then this wonderful element, which surrounds our globe, and is too subtile for our eyes to behold, and yet so strong that nothing can resist its force, a most evident proof of the wisdom of God?

The power of gravitation existing in all bodies, preserves the mountains in their places, restrains the ocean within his depths, and keeps the earth within her prescribed orbit; supports every created being in its proper place in nature; and prescribes to the stars of heaven the course they are to observe.

Who can enumerate the various uses of water? It serves to dilute, to soften, to dissolve, and mix, many substances which we could not otherwise use. It constitutes a most wholesome beverage, is the chief nourisher of plants, sets in motion mills and other machines, is the habitation of fish, and bears upon its surface treasures from the four quarters of the globe.

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How varied and numerous are the effects of fire! And it is not only in the natural world that we see many diversified effects proceed from the same cause; in the moral world we also often see a single disposition of the mind produce effects not less various. Let us take for example the natural inclination which prompts us to love our fellow-creatures. From this are derived the solicitude of parents for their children; social union; the bonds of amity; patriotism; goodness in those who govern, and fidelity in those who obey. Thus a single propensity keeps each individual in the circle prescribed for him; becomes the bond of civil society; and is the principle of virtuous actions, laudable enterprises, and innocent recreations. All this furnishes the most evident proof that the world is not made by accident, nor the materials which compose it put together by chance, without relation or connexion between each other; but, on the contrary, that it forms a regular whole, which the divine Power has ordered with infinite wisdom; and in every phenomenon of the visible world some rays of this ineffable wisdom blaze forth, and declare the unutterable goodness of God.

JULY XXIX.

OF SOME DISEASES OF PLANTS.

Vegetables are subject to many diseases. Sometimes they are covered with a white matter which sticks to them like dust, and is called mildew. This does not happen from insects, as is commonly believed; but from a stagnation in the juices, and a beginning of corruption, which attracts insects, and invites them to deposite their eggs. The stagnation of the juices is the first stage of corruption; and it is supposed that that alone is sufficient to attract insects, because they are seen to swarm by millions as soon as, from whatever cause, natural or artificial, the circulation of juices in a tree is stopped. Hence the feeblest trees, and those exposed in unfavourable situations, are the most subject to this malady. If insects were really the cause of it, it could not be produced by art; whereas, if a tree is purposely wounded, or deprived of the care it requires, it will become subject to the mildew. And upon this tree, so weakened, immediately are seen thousands of insects, whilst the neighbouring trees are free from them. Hence this corruption is no more owing to insects, than is the decay of animal substances; we must look for the cause of it in the obstruction of the juices, which may be occasioned by many circumstances.

A matter resembling dew, but which is glutinous, sweet, and acrid, frequently destroys plants. It has been thought that insects conveyed this glutinous juice into vegetables, or that bees had deposited honey upon them. But frequent observations have demonstrated that this matter falls from the air in form of dew. In certain coun-

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tries it is deposited in small drops upon a great variety of different vegetables; and in the space of a single night it will cover almost all the leaves of a long row of trees, upon which it had not been before perceived. Perhaps this dew may be formed from the exhalations which arise from flowers and blossoming trees, out of which the bees extract their honey; and if more is deposited in one place than in another, it is owing to the direction of the wind. Perhaps also it may be the effect of some disease in the plants from their juices being vitiated; for it is the branches, leaves, bushes, and weakest trees, that are most subject to this disease. It is also remarked, that the leaves upon which this species of dew falls become spotted and black, and soon spoil; most probably this substance is the cause of it.

Here we find evident traces of divine Wisdom; for, since insects require nourishment, it is advantageous to us that they are directed to obtain it from those vegetables which, being already spoiled, are become useless, if not prejudicial to us. And this is a new proof of the particular provision which God made for man when he established the world. It is owing to this arrangement that these insects take nothing that is necessary for our support; but on the contrary attach themselves to that which would be destructive to us. In the wise economy of Nature, each plant, tree, and animal, serves for the support of different creatures.

JULY XXX.

MEANS OF SUBSISTENCE WHICH NATURE PROVIDES FOR ANIMALS.

It is a great proof of the goodness and supreme power of the Almighty, that there is every where provided a sufficiency of aliment for all the living creatures with which the world is filled. It is not indeed wonderful that the countries which lie within the temperate zones should supply their inhabitants with a sufficiency of nourishment; but that this should be the case in all places, even where we had least reason to expect it, and that the necessary provisions never fail to so many species of animals, can only be attributed to the cares of a beneficent and all-wise Providence. He has proportioned the supply of provisions to the number and wants of the animals which are to consume them. In most places there is a superabundance; but this profusion is not so great as to cause the alimentary matter to spoil or decay, for that would be prejudicial to the world.

Among the many articles of nourishment, those which are most useful and necessary are generally found in the greatest abundance, and multiply the most readily. As there are a great number of animals which only live upon herbs, the meadows abound with them and the most wholesome plants, that grow spontaneously without the least culture, and easily resist the inclemency of the air. It is also highly worthy of attention, that corn, which is such a great source of

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food for man, can be cultivated with so little trouble, and increase so astonishingly.

It is also a wise regulation of the Creator, that the taste of animals is so varied, that some love to feed upon herbs and corn, some upon flesh, others upon insects, &c.; some are content with a little, others are very rapacious. If all species of animals had an inclination for the same kind of food, the earth would soon become incapable of satisfying their wants, and would presently be converted into a vast desert. The diversity of taste then that we find among animals is a certain proof that it is not by accident that they prefer any particular kind of food, but from a particular instinct implanted by nature, which leads them to those aliments best adapted to them. By this means all the productions of the earth and of the sea are properly distributed; not only every thing which breathes is amply provided for, but those substances which, becoming putrid, might be prejudicial, have their particular uses. For the wholesome plants would perish; the carcasses of birds, fish, and animals, would exhale the most poisonous effluvia; but that it has pleased the all-wise Creator to implant in animals an inclination for these different substances, which furnish them with an agreeable aliment.

Nutritious matters offer themselves spontaneously to the greater part of animals; they must therefore possess great skill in discerning them, and must employ great precaution in their choice. They are so constituted, that what is highly nourishing to one species, is injurious and sometimes poisonous to another. From the experiments and observations of botanists, it appears that oxen eat of two hundred and seventy-six species of grass, and reject two hundred and eighteen; that goats eat of four hundred and forty-nine, and leave untouched one hundred and twenty-six; that sheep feed upon three hundred and eighty-seven, and there are one hundred and forty-one which they will not feed upon; that the horse eats of two hundred and sixty-two, and refuses two hundred and twelve. Some animals are obliged to go to a great distance in search of nourishment; and obtain it with much labour, by digging for it in the earth, or collecting it from various parts where it is thinly scattered. Some choose the dead of night to satisfy their hunger in safety; others obtain their food by separating the grain from its husks, bruising them if hard; and some swallow small stones to assist them in digesting. Many would perish if they did not carry provisions into their nests against a future time of need. Others take their prey by having recourse to wiles and cunning, by laying snares, and by digging holes in the ground; and some pursue their prey in the air, in water, and upon land.

The more diversified is the food of animals, and their manner of procuring it, the more admirable is the wisdom and goodness of God displayed in their preservation. Let us then reflect upon the glorious perfections of our Heavenly Father; for the occasions which we find to magnify his name are more frequent than the day.

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JULY XXXI.

MEDITATION UPON THE WORKS OF NATURE.

O Father, Creator of the universe, and Preserver of every living creature, how great is thy majesty! How many are the wonders which thou unfoldest to the eyes of man! Thy hand has extended the heavens and planted them with stars. To-day I see the sun animate nature, and blaze above the horizon in meridian splendour; but perhaps, ere to-morrow's dawn, to me no more will the groves, the meadows, and the valleys, repeat the melody of the birds. I feel that I am mortal; my strength fades like the grass of the field, and withers like the falling autumnal leaf; the strongest among us knows not how soon the awful summons shall be heard, Man, return to dust!

When laid low in the grave, where darkness and mournful silence reign, when the worms are gnawing our once fair bodies, what will remain to us of our earthly possessions? Will not they be all lost to us, though our utmost desires had been gratified, and our cup of happiness during life had been full?

How foolish it is to be attached to the perishing things of this world! to aspire after great riches; to be ambitious of honours, vain and transitory; and, suffering ourselves to be dazzled and misled by the false lustre of their meretricious charms, exchange our innocence and peace of mind, for envy, pride, and deceit.

If, too greedy in our desires, we have pursued the phantom of wealth beyond the just limits of moderation, let us humble ourselves before our God, and receive that chastisement his wisdom shall direct.

Man, blinded by his pride and his presumption, would wish to prescribe laws to his Creator, and dares to blame the decrees of eternal Wisdom. But the all-powerful and benevolent Father and Friend of man loves him better than he does himself, by refusing to grant his foolish desires.

When the morning opens to our rejoiced sight, the green fields and budding flowers glistening with dew, and the wings of the night have cooled the burning summer heat, wisdom cries out to us, Why will you cherish in your bosoms gloomy thoughts of futurity, and give yourselves up to doubts and heart-consuming care? Is not God our Father, and are we not his children? Will not He who made us also provide for us? Our existence is not confined to this earth; it extends to heaven. Our present life is but for a moment, and the greatest earthly happiness is no more than a dream; we are designed for another state, that of immortal beings.

The contemplation of immortality elevates our souls above the earth and all present things, beyond the universe and all the heavenly spheres, unto the everlasting Fountain of glory and light.

When seduced by false pleasures from the path of virtue, may sentiments like these awaken our hearts to a sense of our duty, and a

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conviction that true pleasure only can arise from a consciousness that we are employing our time and our talents in the promotion of truth and of all good! The ill-acquired honours of the wicked soon perish; and the bitterness of anguish succeeds their short-lived glory, and false, fleeting, mistaken pleasures.

We are but as pilgrims journeying through a country, at the utmost boundary of which we see the rays of glory emanating; and nothing short of this should possess our hearts: unallured by the pleasures, and undazzled by the splendour, the riches, and the honours, that would seduce us from the true and only road to immortal felicity, we should steadily hold on our course, in the confidence of integrity, of virtue, and of ability; praying to the Almighty God, who with pleasure and parental love watches over us, that in the infinity of his goodness he will be pleased to soften our hearts, that they may not become hardened by the scenes we are obliged to pass through, in our mortal career, and that all our thoughts may be purified by charity and religion; that we may not covet outward grandeur, but be content with our condition and allotment, faithful in the discharge of every duty, and worthy the name of Christians.

AUGUST 1.

VARIETIES OF STATURE IN MEN.

The height of the human body varies considerably; the ordinary measure of stature is from five to six feet. Some inhabitants of the northern countries and the borders of the Icy Sea are not five feet high. The shortest men yet known inhabit the mountains in the interior of the island of Madagascar, being scarcely four feet high. Many of these diminutive people came originally from countries where the inhabitants are of the ordinary size; and the chief cause of their degeneracy must be attributed to the nature of the climate which they now inhabit. The excessive cold that prevails during the greatest part of the year, causes the vegetables and animals there to be less than in other climates; and why may not man be affected by the same circumstances?

On the other hand, there are countries whose inhabitants are of the most gigantic size. The most celebrated of these are the Patagonians, who dwell near the Straits of Magellan. They are said to be from eight to ten feet high. And it certainly seems by no means impossible that there should exist men greater in stature than Europeans; besides the traces we meet of them in the histories and monuments of antiquity, we have sometimes seen in our climate men above six feet and a half in height, perfectly well formed, healthy, and capable of every exertion and labour which demands force and agility. Adorable Creator! thy wisdom is also evident in the varieties of the human form. All that thou hast created, whether in the animal ve-

getable, or mineral kingdom, has been formed by certain rules, and organized by certain laws; whilst every thing bears thy image, and is strongly impressed with thy power.

AUGUST II.

VEGETATION OF THE STALK OF WHEAT.

The wheat-plant is composed of the principal stem, of the stalks growing from its sides, and of the branches which proceed from these. The stalk begins to form as soon as four green leaves appear. If the little plant is then taken, and the lower leaf carefully separated, a small white point may be seen, which in time becomes a stalk, and the root appears under the first leaf. The white point springs from a knot, opens out into green leaves, and pushes from the side a new point. However, these different points, and the stalks which grow from them, are not all designed to bear fruit; many of them decay and perish. When the principal stem has acquired some growth, a considerable revolution takes place in the plant, and all the sap is then employed in the formation of flowers and fruit.

But before that, and when the plant begins to vegetate, four or six leaves are seen to form and spring from as many knots. These prepare the nutritive juice for the ear, which is seen very diminutive in spring upon opening the stalk through the middle. When the plant begins to bud, the two upper leaves of the stalk join together, embrace the ear of corn, and protect it till it has acquired some degree of consistence. Before that, all the knots, particularly the two last, though soft, are closely connected, leaving very little space between them. But, as soon as the ear has pierced its coverings, these parts lengthen, and the leaves give them all the juices they contain. The knots gradually become harder, and the lower leaves dry up; the juices which nourished them are then only employed in supporting the stem.

After all these preparations, the blossom appears. It is a little white tube, very delicate, and grows from the seed leaf. Several more small stalks surround this bag. They are at first yellowish, then brown, and just before they fade and fall off become black. The principal use of these stalks is to nourish a little cluster in the bag of grains. When the corn has ceased to blossom, we see grains which contain the germ, and which arrive at perfection long before the farinaceous matter appears. This matter gradually increases, whilst the sap collects round an extremely fine and delicate part, resembling down. This substance, which exists after the blossoms, serves to support the opening of the great tube passing through the corn. The fruit begins to ripen as soon as it has attained its full size; at that time the stalk and the ear become white, and the green colour of the grain changes into yellow or light brown. The grains, however, are

still very soft, and their farina contains much moisture; but when the corn has arrived at maturity, they become hard and dry.

We cannot sufficiently admire the wisdom manifested in the structure and vegetation of corn; those who are accustomed to reflect will discover it in the least stalk. Even the leaves which surround it before it has attained its full growth, have their use: and they seem to be placed round the stalk for the same reason that an architect raises a scaffolding round a building he is about to construct, and when it is finished removes the scaffolding. For when the corn has acquired its full size and strength, the leaves which defended it dry and perish. It is some months before the ear ventures to appear and expose itself to the inclemency of the weather; but as soon as all the preparations for the flowers and fruit are ready, it appears in a few days. The stalk and the ears of corn are both constructed with equal intelligence. Merciful and beneficent Father! may all those who now walk through the fields of wheat, and joyfully behold the waving corn, experience all the sentiments of love and gratitude which thy liberal bounty ought to excite in their hearts; and may they unceasingly endeavour to imitate, and by their actions deserve, such goodness!

AUGUST III.

DOG-DAYS.

The sun has not only a diurnal motion, which carries him from east to west, and which occasions the revolution of day and night; he seems also to have another sensible motion from the west to the east: in consequence of which, at the expiration of three hundred and sixty-five days, he is near the same stars from which he was separated for six months, and again approached during the other six months of the year.

Hence ancient astronomers have divided the seasons by the stars which the sun meets in his annual course. This course they divided into twelve constellations; these are the twelve signs of the zodiac, which they called the twelve houses of the sun, because he appears to remain a month in each of them.

The summer season begins when the sun enters into the sign Cancer, which happens on the twenty-first or twenty-second of June. It is then that he attains his highest degree of elevation above the horizon, and that his rays fall most directly upon us; and at this juncture the summer heat begins, which becomes more intense in the ensuing month, as our earth becomes more heated by the burning rays of the sun. Hence it happens, that the month of July and a part of August are generally the hottest portion of the year; and experience has proved, that it is from the twentieth of July to the twentieth of August that the greatest degree of heat prevails. Of all the stars with which the sun comes in conjunction, the dog-star is the

most brilliant; lost in the sun's rays, it disappears from us for a month, (as is the case with all the stars that the sun meets in his course,) and the month in which it is not seen is the time called the dog-days.

Those observations would be of little importance, if they did not tend to combat a prejudice deeply rooted in the minds of many people. An ancient tradition attributes the heat experienced at this time to the influence of the dog-star upon the earth. But this opinion is absurd; because the occultation of the dog-star in the sun's rays does not always take place at the time we call the dog-days. These days, properly speaking, do not begin till the end of August, and terminate about the twentieth of September. And as the dog-star, or Sirius, always advances farther, in time it will reach the months of October and November, and at last to January; so that the most intense cold of the year will prevail in the dog-days.

When we consider this we shall perceive that it is impossible that this star shall occasion the great heats which we experience. When therefore in the supposed dog-days every thing is languishing or consumed, the waters dried up, and the springs fail, matters subject to fermentation become sour, animals are attacked with madness, and men with various maladies; it is not because a star is concealed behind the sun, but from the excessive heat of the weather, occasioned by another cause.

It is time then to renounce a prejudice so childish and absurd. To believe that certain figures, which the imagination forms in the sky, can have any influece upon our earth, or upon the health or the reason of man, bespeaks a great want of judgment. It is not the stars, but ourselves, that we ought to accuse of all the evils which we suffer. Can we believe that an all-pure and good Being, who governs the universe, has created any thing in the heavens or in the earth for the torment and misery of his creatures? This would be believing in an inevitable fatality; which we cannot admit of, if we acknowledge a Creator whose essence is wisdom and goodness. Let us then, instead of being guilty of this error, glorify our God, and assure to ourselves tranquillity and peace of mind, in the belief that we are under the peculiar care of a superintending Providence, without whose permission not even a hair of our heads can perish.

AUGUST IV.

SLEEP.

People fall asleep with more or less rapidity, according to their natural constitution and present state of health. But whether sleep arrives soon or late, it always comes in the same manner; and the preceding circumstances are the same in all men.

The first thing that happens when we begin to sleep, is the stupor of our senses; which, no longer receiving external impressions, fall

into a state of inactivity. Hence it follows that the attention diminishes, and at length ceases; the memory becomes confused; the passions are calmed; and the connexion between our thoughts and reasoning faculty is interrupted. As long as we feel the influence of sleep, it is only the first degree of it; we may then be said to be in a dozing state. When we are really asleep, we have no longer that consciousness and reflection which depends upon the exercise of memory; our eyelids wink, open, and shut, of themselves; the head reclines in an easy position; and when our sleep is quite profound, all voluntary functions are suspended; but the vital functions, and all those which do not depend upon the will, are still performed with vigour. A sweet sleep refreshes and repairs our exhausted nature; and we rise from our slumbers with increased energy, capable of again renewing the fatigue of the day.

All these circumstances are well calculated to make us acknowledge the goodness of God, so mercifully extended to us in his tender care to procure us the blessing of sleep. We ought to be still more thankful, when we consider the effects of sleep being ushered in by a complete suspension of activity in the senses; and that it steals upon us unawares, and in a way not to be resisted. The first of these circumstances renders it more sound and refreshing; the other makes it an unavoidable necessity. And how wisely is it ordered, that by the spontaneous closing of the eyelid the eye is defended when we are not able to preserve it from the dangers to which it would have been subjected!

Let therefore the hour in which we dispose ourselves to enjoy the sweet influence of sleep be always preceded by thanksgivings to our Heavenly Father. Let us not only bless him because the days happily succeed each other, but also because he has so constituted us, that a state in which for a space we repose from the cares, the troubles, and the vexations of the world, is to us a state of refreshment, in which we require new force and gain accumulated vigour. Let reflections like these be the last which take place before sleep surprises and locks up our soul in silken fetters; and when morning dissolves the charm, let love and gratitude to our God be the first emotion of our heart.

AUGUST V.

DIVISIBILITY OF MATTER.

To be convinced of the infinite divisibility of bodies, we have only to walk into a garden, and inhale the sweet incense that rises from a thousand flowers. How inconceivably small must be the odoriferous particles of a carnation, which diffuse themselves through a whole garden, and every where meet our sense of smell! If this is not sufficient, let us consider some other objects of nature; as, for instance, one of those silk threads, the work of a poor worm. Suppose this

thread is three hundred and sixty feet long, it weighs but a single grain. Again, consider into how many perceptible parts a length of three hundred and sixty feet can be divided. A single inch may be divided into six hundred parts, each as thick as a hair, and consequently perfectly visible. Hence a single grain of silk can be divided into at least two millions five hundred and ninety-two thousand parts, each of which may be seen without the help of a microscope. And as every one of these parts may be again divided into several more millions of parts, till the division is carried beyond the reach of thought, it is evident that this progression may be infinite. The last particles which are no longer divisible by human industry must still have extension, and be consequently susceptible of division, though we are no longer able to effect it.

Again, if we examine the animal kingdom, we shall discover still further proofs of the infinite divisibility of matter. Pepper has been put into a glass of water, and on looking through a microscope, a multitude of animalcules were seen in the water, a thousand million times less than a grain of sand. How inconceivably minute then must be the feet, muscles, vessels, nerves, and organs of sense, in these animals! And how small their eggs and their young ones, and the fluids which circulate in them! Here the imagination loses itself, our ideas become confused, and we are incapable of giving form to such very small particles.

What still more claims our attention is, that the more we magnify, by means of glasses, the productions of nature, the more perfect and beautiful do they appear; whilst with works of art it is generally quite contrary; for, when these are seen through a microscope, we find them rough, coarse, and imperfect, though executed by the most able artists, and with the utmost care.

Thus the Almighty has impressed even upon the smallest atom the stamp of his infinity. The most subtile body is as a world, in which millions of parts unite, and are arranged in the most perfect order. What astonishing wisdom is that which operates with as much order and perfection in the minutest as in the largest works! How infinite that power which has brought out of nothing such a multitude of different bodies! And how gracious is that goodness which so richly displays itself in the most minute productions, seeing that each of them has its perfection and use.

Considerations like these tend to make us feel the limits of our capacity; the smallest insect, the least grain of dust, may convince us that there are thousands of things of which we are ignorant, and cannot explain. Let him who boasts of his talents attempt to enumerate the parts of which the body of an animal, a million of times less than a grain of sand, is composed. Let him try to determine how minute one of those rays of light must be, when several millions of them can pass through an opening not larger than the eye of a needle. His ideas will soon be confused; and he will be obliged to acknowledge his ignorance, and confess the narrow limits of his capacity. How then can we be proud of our knowledge, and have the

presumption to blame the decrees of Providence, or dispute the arrangements he has made in nature? It is our duty, and even our glory, to acknowledge our ignorance, and in all humility bow before the infinite God.

AUGUST VI.

EXTERNAL STRUCTURE OF INSECTS.

Men in general are too apt to judge those animals only worth their attention which are most remarkable for their bulk. The horse, the bull, the elephant, and other large animals, seem to attract our attention, whilst we scarcely condescend to regard those innumerable multitudes of small insects which fill the air, the vegetables, and the dust. How many insects do we trample upon? How many caterpillars do we destroy? And how many flies buzz around us without exciting our curiosity, or any other thought than how to deprive them of life! But let us never forget, that the same wisdom and power is manifested in the structure of the meanest worm, as in that of the lion or the elephant.

The bodies of the greater part of insects are composed of several rings, which close on each other, and have a share in all the motions of the animal. The essential characteristic which distinguishes insects from other animals is, that they have no solid bones. And much wisdom is manifested in this part of their formation; the motions which are common to all insects, the manner in which they are obliged to seek their nourishment, and the changes to which they are subjected, could not be so easily performed, if, instead of those flexible rings, which separate from and approach nearer one another as the animal wills, their bodies had been connected and strengthened by bones.

It is observable in several insects that they have the power of contracting or enlarging their heads at pleasure; that they can elongate or shorten them, conceal or make them appear, as their inclination or necessity urges. There are others, whose heads always preserve the same form. The mouth of insects is generally provided with a sort of teeth, or with a trunk. This disposition of the head is necessary, both on the account of the aliments which the insects feed upon, and because of the dangers to which they are exposed.

Many insects have not the faculty of vision; but this is compensated by their more exquisite feeling, or some other sense. They have two kinds of eyes: those which are bright and smooth are usually very few in number; but those eyes which resemble network or shagreen, and of which the cornea is cut in angles, are extremely numerous; there are sometimes thousands of them, and as they are not moveable, this defect is supplied by their number and position. The antennæ, or horns, with which most insects are pro-

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vided, are of particular use to them; they are extended before the body when it moves, and feeling out the way, not only inform the creature of the dangers which threaten it, but also enable it to discover the aliments best suited to its nature.

The legs of insects are either scaly or membranous: the former move by means of several joints; and the others, which are softer, move in all directions. Sometimes both these species of legs are found in the same insect. Some insects have several hundred feet, but their motion is not accelerated by them.

The variety observable in the form and constitution of the limbs of insects is almost infinite; and the lives of many men would scarcely suffice to describe the different figures of this minute part of the creation. How curiously must the legs of those insects be constructed which fasten on smooth and polished surfaces! How elastic the legs of those which leap! and how strong must those be which dig in the ground! Two or four wings are placed in the middle of the body. Some of them are as transparent as fine gauze, others are scaly and mealy; some are without any covering, others are concealed in cases or sheaths. At the sides, or at the extremity of the body, there are orifices something like the pupil of the eye; they are called stigmata, and are the organs of respiration. How various are the forms of the insects which walk, fly, leap, and crawl! and yet in all a most perfect harmony and proportion of form is observable. And not to acknowledge in all this the infinite wisdom of the Creator, is the height of folly and absurdity; we are only virtuous and rational in as much as we confess an Almighty and Supreme Power, and bless and adore him in all the works of the creation.

AUGUST VII.

COMPARISON BETWEEN THE SENSES OF MEN AND THOSE OF ANIMALS.

Are any animals endowed with more perfect senses than man? In certain particular instances some of them undoubtedly are; but in general man is more highly favoured in this respect than all other animals. It is indeed asserted, that the spider has a finer feeling; and the vulture, the bee, and the dog, a keener smell. We know that by means of this sense the hound pursues his game; and other dogs discover things beneath the ground. The hog also, guided by his smell, digs in the earth for food. Stags are supposed to have the sense of hearing so acute, that they can hear the sound of bells at several miles distance; and the mole hears better below the earth, than man, who dwells upon the surface.

With regard to sight, the eagle among birds, and the lynx among quadrupeds, are said to be much more perfect than man. Though these observations are true; yet if we consider animals in general,

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and compare them with man, we must immediately be struck with his great pre-eminence in the creation. He is by nature endowed with five senses; and this advantage is not enjoyed by one half of animals. The zoophites, which form the connecting link between the animal and vegetable kingdoms, have only the sense of feeling. Many animals have only two senses, others three, and those which have five are considered as the most perfect class. But these have very seldom all their senses more perfect than men, some of whom enjoy them in a very exquisite state. Some Indians can judge by their smell what quantity of alloy is mixed with the precious metals, as well as we can by the touchstone. Others will discover at a very great distance the retreat of a wild beast. The inhabitants of the Antilles will distinguish by their smell whether a Frenchman or a negro had last passed along the road.

The acuteness of his senses in some degree compensates the wild Indian for his want of education. Many people, by exercise and great attention, have improved certain senses to a wonderful degree of perfection; and if man, like other animals, was destitute of the reasoning faculty, and had no means of procuring food, or preserving himself from danger, but his organs of sensation; these by continual exercise would doubtless have acquired the highest degree of refinement and acuteness. But constituted as he is, man has no occasion for more acute senses than those he already possesses. The gift of reason abundantly compensates him for the advantages that some animals have over him; and we may even assert with confidence, that if our senses were more refined, we should experience great inconvenience from them. Let us take for example the sense of hearing; if we had this sense so acute as the safety of some animals requires it to be in them, the most distant noise, and the confused clashing of a vast number of sounds, would continually interrupt our meditations and repose, and prevent our most noble and useful occupations.

Let us then be thankful that the infinite wisdom of God has so well arranged the degree of our sensations, that they enable us fully to enjoy the blessings of nature, without interrupting the workings of the soul. The limited degree of our senses is then rather to be considered as a gain than a loss; as a perfection, rather than an imperfection: and happy is the man who suffers his reason to control and restrain his senses, when they impel him to deviate into folly, or plunge into the mad vortex of fashion.

AUGUST VIII.

THUNDER.

The thunder rolls! Consider, O man, who it is that causes this dreadful roar! Who is it that darts the lightning from the clouds?

it is the Lord of the universe; the arm of the mighty God hurls the thunderbolt.

Nature reposes in his hand; he preserves and blesses her; but his voice will be heard, and at the sound thereof the heavens shall be consumed, the earth devoured by the flames, and they shall be no more.

The thunder peals! Dreadful is the sky involved in storms! The lightning flashes, and the thunderbolt is shot! Great is our God, and omnipotent his power! The Lord looks down from his throne, and by the lightning's gleam we see the grave open under our feet.

When the God of heaven rides upon the whirlwind, men tremble and are afraid; when he unveils his face the universe turns pale, and none can behold the glory of his countenance.

The sinner hears his voice, and his soul sinks appalled; he dare not look upon him whose counsels he has neglected. The good man contemplates the majesty of God without fear; and his soul is untroubled amid the tempest's howl and the storm's fierce rage. The Lord shields him from the thunderbolt, which strikes terror into the heart of the wicked.

And though it is the will of his Heavenly Father that the righteous man should die, he cheerfully resigns his soul into the hands of his Maker; and his last words proclaim his inward peace, and that whether he lives or dies, his only hope is in his Saviour and his God.

He who directs the thunder is the friend and all-consoling hope of the Christian. What though he should take me away suddenly from among the living? It is that I may dwell in the regions of light and glory, and ever drink of the pure fountain of bliss.

He who, when the sky is serene, and every wind is hushed, glorifies his Creator with joy and thanksgiving, is still calm and undaunted when the sinner is hiding himself from the threatening storm.

But whither will he fly? Can he escape the eye of an all-penetrating God? In vain does he attempt to hide himself; the lightning pursues and smites him in his dark retreat.

Think not of escaping then, O ye wicked, nor trust that flight will save you; renounce your errors, and give up your delusive dreams; ye cannot conceal yourselves from your God, who is every where present. Whilst the thunder roars, you tremble and are troubled; but the tempest ceases, nature breathes, and you return to the deceitful pleasures that have bewildered your reason.

But if you would obtain pleasures that never fail, prostrate yourselves before the throne of God; implore that mercy, which is never refused to the penitent; and forget not the promises that you made, the vows which you uttered, in the hour of your distress, and in the moment of your tribulation; remembering that God has declared he is a God of justice, and will not be mocked.

He is merciful and long suffering; he spares the rebellious, but he will not spare for ever. He is just, and before his holy tribunal we must all appear. What is the thunder that roars over our heads in

comparison of that awful day, when we shall hear the sound of the trumpet; when the elements themselves shall be dissolved by fire; and the earth and all that it contains be consumed by ardent heat.

AUGUST IX.

CONTEMPLATION UPON A MEADOW.

Ye gloomy and majestic woods, where the fir-tree rears its stately head, where the tufted oaks spread their thickening foliage; and ye rivers, whose clear silver streams roll among the blue mountains, or gently glide through the vales below; with you I love to roam, and mark the landscape lessening on my sight, till all is wrapped in shade!

But now other beauties invite me forth; the verdant mead, all gay with flowers, attracts me. Vegetables of a thousand kinds refresh the air; millions of insects, their painted wings glittering in the sun, are flying from flower to flower in sportive mood; whilst others are winding through the dark labyrinths of the tufted grass; all varying in beauty, and each seeking for food and pleasure.

How soothing is the murmur of yon limpid stream, as its waters gently wash the flowers that, bending over the grassy bank, oft kiss the dimpling wave, or dance reflected on its surface!

See those waving plants! what a mild lustre the sun beams on the different shades of green! Some delicately entwine with the grass, and mingle with it their beautiful foliage; others proudly rear their heads above the rest, and display flowers without perfume; whilst the lovely violet, in lowly modesty drest, dwells beneath the bank, and scents the air with fragrant odours. Thus we often see the man of worth and integrity, obscured by poverty, unnoticed, and unregarded, diffuse blessings round his humble sphere; whilst the slave of ignorance and villany, shrouded in the all-protecting garb of riches, consumes in idleness the fruits of the earth, and receives the applause of millions.

How beautiful is nature! The grass and flowers grow luxuriantly; the trees are covered with leaves; the soft zephyr refreshes us; the flocks wanton in the pastures; the little lambs declare their joy by a thousand sportive skips, and frisk lightly over the mead. The green grass, tipped with sweet dew, adorns the field; the leaves tremble in the breeze, and the melody of the nightingale rises from yonder bush. Every thing is joy, every thing inspires love; it reigns on the hills and in the valleys, on the trees and in the groves.

Nature is beautiful even in her least productions. The sporting insects pursue each other in the grass; sometimes lost in the verdure, then rising and displaying their gilded wings, dancing in the sun-beam. The butterfly hovers over the clover, flutters its wings, and seems proud of its charms. The buzzing of a swarm of young bees

now meets my ear. See the flowers bending under them! They have gayly flown from their distant home, and dispersed themselves over the fields and gardens, where they collect the honeyed nectar of the flowers, and riot in luxurious sweets and ever-varying charms.

Happy is the man whose life of innocence smoothly flows imbosomed in nature's sweetest treasures. The creation smiles to him, and joy gilds his glad moments; whether reclining in the evening shade, or brushing with hasty steps the morning dew. Pleasure springs for him from every fountain; every flower yields its charms, and every grove welcomes him to its hallowed shade. For him wild concerts warble in the air; and his mind, serene as a summer's day, knows no corroding, heart-consuming care: his affections are pure as the untainted breath of morn, sweet as the dew-washed flowers: in the beauties of nature he sees his God, and to him devotes his willing soul.

AUGUST X.

MISCHIEFS CAUSED BY ANIMALS.

It is distressing to see some of the finest productions of nature exposed to the ravages of animals. Every summer we observe the mischievous effects of the rapacity of birds and insects in the vegetable kingdom! How many trees are destroyed, and fruits consumed, by worms and caterpillars! And how much necessary sustenance we are deprived of by the insatiable sparrow and greedy raven! These and similar complaints are often uttered by men who seem to imagine that certain animals only exist to torment mankind. It is true, there is some foundation for such complaints; and it must be granted that some creatures do occasion much mischief. It is more easy to exterminate wolves, lions, and other wild beasts, than to extirpate insects, whose numerous swarms cover a whole country. In Peru a species of ant called chako is a terrible scourge to the inhabitants; and their lives would be endangered if they did not use precautions to get rid of these formidable insects. The devastation made by caterpillars on our fruit-trees, and by mice in our fields is well known.

But however great these inconveniences may be, they do not authorize such bitter complaints as some people make. We are pleased to see the animals which are mischievous to us destroy one another; we think we may without injustice deprive animals of life, either for our food or any other purpose; but we cannot bear that they should take any thing from us. But have we more right to take away the life of a gnat, than it has to take a drop of our blood? Besides, in complaining of the voracity of animals, we do not consider that this arrangement of nature is not so disadvantageous as it may at first sight appear. To be convinced of this, we have only to consider the animal kingdom in an enlarged point of view. We shall then find, that

many species of animals, birds, or insects, apparently hurtful, are on the contrary of great utility. Several years ago, the inhabitants of the then English colonies of America endeavoured to extirpate the tribe of jays, because they imagined that these birds did great injury to the corn. But the number of jays was scarcely diminished, when immense numbers of worms, caterpillars, &c. ravaged their cornfields. They immediately stopped the persecution of the jays; whose numbers again increasing, soon put an end to the plague, the consequence of their destruction.

Some time ago a project was formed in Sweden to destroy all the crows; but it was observed, that these birds were not only fond of seeds and plants, but they devoured a great number of worms and caterpillars, which live upon the leaves and roots of vegetables.

In North America great exertions were used to drive away the sparrow tribe; and in consequence of their success, the flies and gnats multiplied to such a degree in the marshy countries, that large tracts of land were left uncultivated.

Pheasant-hunting is so considerable in the island of Procita, that the king of Naples prohibited the use of cats to the inhabitants. In a few years the rats and mice becoming extremely numerous, caused so much mischief, that his Neapolitan majesty was obliged to revoke his decree for the annihilation of cats.

Why should we be so selfish as to wish to deprive animals of the provisions necessary for their subsistence? Are we able ourselves to consume all the fruits of the earth? And do we find any deficiency in our sustenance or our pleasures, because birds, insects, and a few animals, partake with us of the blessings which God has so bountifully bestowed, and of which a part must spoil if these creatures did not make use of it? Instead then of indulging in unjust complaints, let us rather acknowledge the wisdom of our Creator. Every thing is connected in the vast kingdom of nature; no creature is useless, or placed there without an end, though we are ignorant of the destination of many animals. It is sufficient that they exist, for us to suppose that they are created for the wisest purposes.

Thus the consideration of the apparent disorders and imperfections of nature leads us to God, who has created nothing in vain, who preserves nothing without reason, and who, when he permits any thing to be destroyed, does not do it without some useful design. If we were sufficiently convinced of these truths, all the works of God would excite us to glorify and to bless his divine power and goodness.

AUGUST XI.

VARIETY OF COLOURS.

When we consider how dull and gloomy our fields and gardens would be, and how indistinct every object would appear, were these

only one colour, we must acknowledge the wise goodness of God, who by causing such a diversity of hues, has increased and varied our pleasures. Objects which are designed to be seen at a distance are painted in glowing colours, and are striking by their grandeur; such are the heavens: whilst those objects which we can contemplate nearer, as birds, flowers, &c. have a peculiar lightness, fineness, delicacy, and elegance.

But whence proceeds the difference of colours? Each ray of light appears to be simple, but by refraction it is divided into several, and hence arises the diversity of colours. A glass filled with water and exposed to the sun, reflects certain colours upon white paper; and angular glasses, or prisms, reflect still more vivid colours. By holding a prism towards the sun, we may see the colours of the most beautiful rainbow; or it may be done by receiving a ray of light on the prism, through a small hole in the window-shutter of a room closely shut. As the refraction of the ray is more or less strong, the colours will be more or less vivid. The most refrangible ray is the violet, and consequently it is the weakest. Next to it is the indigo; then the blue, next the green, then the yellow, next orange, and lastly the red, which is the least refrangible of all.

The nature of coloured bodies contributes much to the diversity of their colours. The smallest particles of most bodies are transparent; hence they break, absorb, or reflect, the rays of light, sometimes one way and sometimes another, like prisms. And what completely proves that colours are not inherent in bodies is, that the neck and plumage of a pigeon or peacock; and stuffs, such as taffetas, and other silk stuffs, &c.; change colour according to the position in which they are placed. This may enable us to understand whence the variety of colours proceeds; which is nothing more than that the surface of bodies is composed of extremely thin laminæ, which, according to their thickness, reflect certain coloured rays, whilst they admit or absorb others in their pores. Thus, when a body whose surface is smooth reflects and throws back almost all the rays of light, it appears white; but when it absorbs them all, it is black.

Let us here admire the goodness and wisdom of God; for, if the rays were not divisible and differently coloured, all would be uniform, and we could only distinguish objects by reasoning, and by the circumstances of time and place. We should be reduced to the most awkward perplexity and uncertainty; our eyes would be fatigued with constantly seeing one colour, and we should be weary of the continued uniformity. But the diversity of colours existing in nature diffuses beauty over the earth, and procures new and repeated variety of pleasure. In this we have abundant proof of the provident cares of God; who has provided for our pleasures as well as our necessities, and in creating the world has regarded the beauty as much as the perfection and utility of his works. Far as the eye can reach, we discover new and varied beauties in the plains, in the valleys, and the mountains; every thing conduces to our pleasure, and calls forth our gratitude.

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AUGUST XII.

HABITATIONS OF BEAVERS.

If a man who had never heard of the industry of beavers, and their manner of building their dwellings, were shown the edifices which they construct, he would suppose them to be the work of some most skilful architects. Every thing is wonderful in the labours of these amphibious animals; the regular plan, the size, the solidity, and the admirable art of their buildings, must fill every attentive observer with astonishment. The beavers choose their place of abode where there is a plentiful supply of provisions, and a river in which they may form a lake to bathe in. They begin by constructing a dike or bank, which keeps the water level with the first floor of their building: this bank is sometimes a prodigious work, from ten to twelve feet thick at the foundation; it is made sloping, and gradually diminishes in thickness, till, towards the top, it is not more than two feet broad. The materials of which it is composed are wood and clay. The beavers cut pieces of wood as thick as a man's arm with great facility. They fix these in the earth by one of their extremities, very near to each other, and entwine round them other pieces that are smaller and more flexible. But as the water may still pass through, and leave their watering-place dry, they make use of clay to fill up all the interstices both within and without, so well, that the water cannot possibly flow through; and in proportion as the water rises, they raise their bank.

Having finished their dyke, they begin to work at their houses; which are round or oval buildings divided into three stories, raised one above the other, one of which is below the dike and generally filled with water, the other two are above. They fix these buildings very firmly upon the brink of their lake, and always with stories, that if the water should rise, they may still be able to lodge above it. If they find a little island near the watering-place, they build their house upon it, as being more firm, and they are also less incommoded by the water, in which they cannot remain long at a time. If this convenience is not to be obtained, with the assistance of their teeth they force stakes into the earth to support their building against the force of wind and water. They make two openings at the bottom to go out into the water; one leads to the place where they bathe, the other to the place where they deposite whatever might dirty their upper apartments. They have a third door, placed higher up, for fear of being taken when the ice closes up the lower doors. Sometimes they build their houses entirely upon dry ground, and dig ditches from five to six feet deep, down to the water. They use the same materials and the same industry for their buildings as for their banks. The walls are perpendicular, and about two feet thick. With their teeth they cut off the ends of the wood and sticks that project from the wall; and then mixing clay with dry grass, they make a composition, with which they plaster, by means of their tail, the inside and the outside

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of their building. The inside of their house is arche
proportioned to the number of inhabitants. A space twelve feet long by eight or ten broad is sufficient for eight or ten beavers. If the number is greater, they enlarge their building in proportion.

The instruments which the beavers use are four strong and sharp teeth; the two fore-feet, of which the toes are separated; the two hind-feet, which are furnished with membranes; and their tail, which is covered with scales, and is like an oblong trowel. With only these simple tools, they excel our masons and carpenters with all their apparatus of trowels, squares, axes, saws, &c. With their teeth they cut the wood which they use in their buildings; their fore-feet serve them to dig the ground, and to prepare the clay. They use their tail both to carry the mortar or clay and to plaster their houses.

The works of beavers then have the greatest resemblance to those of men; and upon their first appearance we may imagine them to be produced by rational and thinking beings. But when we examine them nearer, we shall find that in all their proceedings these animals do not act upon the principles of reason, but by an instinct which is implanted in them by nature. If reason directed their labours, we should naturally conclude that the buildings which they now construct would be very different from those they formerly made, and that they would gradually advance towards perfection. But we find that they never vary in the least from the rules of their forefathers, never deviate from the circle prescribed to them by nature; and the beavers of the present time build exactly after the same plan as those which lived before the deluge. But they are not the less worthy of our admiration. In these sagacious creatures we have an example of the great diversity there is in the instinct of animals. How superior is the instinct of the beaver to that of the sheep! May we profit by our discoveries of the different faculties of animals, so as more and more to advance in perfection, and increase our knowledge of the love and infinite power of God!

AUGUST XIII.

MANNER IN WHICH THE NUTRITION OF THE HUMAN BODY IS EFFECTED.

Alimentary matter, when taken into the stomach, is separated into two parts: the one nutritious, which remains in the body; the other not nutritive, is expelled from it. It is first requisite that the food should be broken, and its parts decomposed. This is begun in the mouth by the process of mastication. The fore-teeth, or incisors, cut and divide the pieces; the canine, or side-teeth, tear them; and the double-teeth grind them small. The tongue and lips also contribute to this, by keeping the food under the teeth as long as is necessary.

Certain glands, pressed upon during the process of mastication, pour out saliva to moisten the food, and render it more easily divisible, as well as facilitate its digestion. Hence the great advantage of well chewing the food before it is swallowed.

The aliments thus comminuted, moistened, and mixed, are received into the pharynx or beginning of the throat; in which canal there are glands that continually secrete a fluid that lubricates the throat, and renders the passage of the food more easy. When this is too dry, the sensation of thirst excites us to drink. The food follows the course of the throat till it is received into the stomach; a membranous bag, in which is secreted a fluid called the gastric juice, by the action of which upon the food digestion is performed. When we have too long abstained from eating, the gastric juice, stimulating the nervous coat of the stomach, occasions the sensation of hunger. The stomach is continually in motion by the contraction of its fibres from above downwards, so that its cavity is straightened; the lower termination rises towards the middle, and the whole is equally contracted. The aliment, prevented from returning into the throat by means of a valve covering the upper orifice of the stomach, readily passes through the inferior opening or pylorus into the intestinal canal, which is properly a continuation of the stomach. This canal is subject to a constant motion, called the peristaltic motion, by means of which the whole alimentary mass is completely agitated.

By the preceding operations, the aliment is reduced to a pulpy mass, which passes slowly through the intestines by means of their vermicular motion; and is there mixed with the bile, which is secreted by the liver, and stimulates the intestines to act. In each intestine are discovered the orifices of very fine vessels, called lacteals. The whitest and purest part of the alimentary mass passes through these, and is conveyed by them into a larger vessel, which passes from the abdomen through the chest, and terminates in the veins. The white colour of the chyle is then lost among the blood, and it is no longer distinguished from that fluid; and thus prepared and perfected, it is conveyed by numerous canals to every part of the body, to which it imparts life and nourishment. The gross and innutritious part which remains in the large intestines, passes from the colon into the rectum, whence in due time it is expelled from the body.

From this short account we learn what a variety of operations are requisite to accomplish one of the daily necessities of our body. How many parts and organs concur in providing for the growth and nourishment of the whole! And what is most admirable is, that all the parts of our bodies which are thus exercised for its nutrition, serve also for other purposes. The tongue, for instance, which contributes so materially to mastication, is also the organ of speech and of taste. In fact, there is not one member of our bodies which has only one office. Let us reflect upon these peculiar mercies of God; and whether we eat or drink, or whatsoever we do, let it be to his glory.

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AUGUST XIV.

NATURE CONSIDERED IN DIFFERENT POINTS OF VIEW.

The works of nature, ever superior to those of art, are particularly so from their admirable variety, which always affords new subjects of wonder and pleasure. We look at a work of art till we become weary with seeing it, or regard it with indifference. But the mind is never fatigued with contemplating and reflecting upon the works of nature, which continually present new charms to the delighted imagination.

When we consider nature in her most sublime and majestic point of view, how astonished we are at the immensity of the heavens, the innumerable multitude of the stars, and the vast extent of the ocean! Compared with these, all the works of art, however great and excellent, are insignificant and contemptible. Every thing that God has created is stamped with a grandeur far surpassing our conception. To give us an idea of his infinity, he had only to form the sky, which displays more magnificence and grandeur than all that the earth contains. Is any thing more likely to inspire us with a profound veneration for God, than to contemplate him in his works? If we are rightly concerned, what a religious awe fills our minds when we behold those grand phenomena of nature which no man can produce; such as earthquakes, volcanoes, storms, tempests, and floods; all of which forcibly impress the mind with the majesty of the Creator of the heavens and the earth!

Nature also is presented under a more pleasing aspect; we see valleys adorned with verdure and flowers, fields which promise abundant crops, and mountains green with trees and beautiful plants. In all these lovely scenes the God of nature shows himself the friend and benefactor of man; he extends his bountiful arm, and plentifully satisfies every living creature. And this present season, in which every thing combines to delight our senses and conduce to our nourishment, furnishes the strongest proofs of his goodness.

But the time approaches when nature will assume a more gloomy appearance; when she will lose her beauty and variety, and resemble a desert void of all pleasure and riches. Every day brings us nearer this mournful season; and the lengthening evenings begin to warn us of the change. Even then nature has still attractions, and winter concurs in the perfection of the creation.

Let us apply these reflections to our lives, which are equally liable to change and sudden variations. To the most happy and delightful scenes often succeed the most trying and unfortunate. Let us then in prosperity prepare for adversity, and in every situation of life glorify and bless the Father and Giver of all good.

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AUGUST XV.

DAMAGES WHICH MAY BE OCCASIONED BY RAIN.

A moderate quantity of rain always contributes to the growth and fertility of plants, and consequently is of great benefit to the earth. But when it falls with too great vehemence, or continues too long, it becomes hurtful to vegetables. When too violent, it forces the delicate plants into the ground; and its too long continuance prevents their growth. A superabundant moisture deprives them of the necessary degree of heat; the circulation of the sap is interrupted; the secretions are imperfectly performed, and the plants droop and are in danger of perishing.

But this is not the only way in which rain is prejudicial. It sometimes causes great destruction. When several clouds, driven by fierce winds, meet in their course high towers, mountains, and other elevated places, they break, and suddenly pour down the water they contain in torrents. This often occasions much damage; for water not being compressible, when it is much pressed it suddenly precipitates itself from mountains and other high places. It is not surprising then that it carries along with it the heaviest stones, beats down trees, and overthrows buildings. Two causes concur in rendering these effects more violent: the great volume of water precipitated, and its rapidity, increased by the height from which it falls; the action of a moving body being in proportion to the mass of matter it contains, and the degree of velocity impressed upon it.

Water-spouts are still more formidable. In figure they resemble an inverted cone, whose base terminates in some cloud, whilst the point is directed towards the earth. These water-spouts attract and draw up every thing in their way, and afterwards dash them down in the torrent. If the point of this conical stream strikes the sea, the water boils, foams, and rises into the air with a terrible noise; and if it falls upon vessels or buildings, it shatters and throws down the one, and so violently shakes the other that they often founder. According to all appearance, this meteor is produced by the action of winds blowing in contrary directions, and which in their passage meeting with clouds, drive them with violence against each other. When these opposite winds strike a cloud on one side, they give them a circular motion, and make them whirl round with considerable velocity. They then take the form of a whirlwind, and their weight being suddenly increased by the force of pressure, they rush down with impetuosity, and in their fall assume the figure of a column, at one time conical, at another cylindrical, which turns round its centre with great velocity; and their violence is in proportion to the quantity of water, and to the rapidity of the descent.

Cataracts and water-spouts are always dangerous. Fortunately the latter very seldom occur on land, though they are frequent at sea. Mountainous countries are more exposed to cataracts than are those

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situations which are more flat and level; and they so rarely happen, that many years often pass before even a few acres of ground are destroyed by them. Such are some of the disastrous effects produced by these phenomena: but the good man, far from murmuring and complaining when he hears the storm howling around him, or witnesses the dreadful devastation of the cataract, bows his head in humility, and acknowledges with grateful reverence the blessings he is daily permitted to enjoy; whilst these interruptions of the general harmony of nature are only partial evils, and very seldom happen. Let us then consider the works of God with humility and adoration, and endeavour to form just ideas of their magnitude and excellence. For, doubtless, infinite order, goodness, and wisdom always prevail, even where the limited faculties of man can discover no traces of their presence.

AUGUST XVI.

CARES OF ANIMALS FOR THEIR YOUNG.

That instinct which leads brutes to preserve their young is one of the most remarkable faculties with which nature has endued animals. We find scarcely any creature which abandons its eggs or its young to blind chance. Their love extends to their posterity in a very great degree, and operates in that way which is best adapted to their nature and different modes of living. Some of these little creatures, which are hatched from the eggs of fish and insects, have no need of being covered by their parent, because the heat of summer is sufficient to vivify and strengthen them; and from the first moment of their birth they are able to assist themselves, provided they are in a suitable place, and have provisions within their reach. The greater part of insects do not live long enough to see their young. Fish and amphibious animals cannot distinguish their young ones from those of the same species; and yet nature teaches them the best means of providing for the principal wants of new generations. Fish swim in shoals, and deposite their spawn near the coasts, where the water being shallow is more easily warmed by the heat of the sun, and where in consequence the young fry are more easily hatched, and obtain the requisite food.

Amphibious animals quit the water and deposite their eggs in the sand, that they may be hatched by the sun's rays; as if they were aware that their young would readily find their true element, and the place in which they are destined to live and seek their food. Gnats, and other insects, which come to life in water, but which afterward live in the air or upon the earth, always lay their eggs where the life of their young is to begin. Insects which fly above the surface of the earth, and which generally require no food for themselves, are, however, careful to deposite their eggs upon plants, fruits, flesh, and

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other substances which will serve as nourishment for their young. Some of them pursue animals, and insinuate their eggs in their skin, hair, mouth, and entrails. Some animals deposite their eggs in nests and cells which they have prepared and stored with provision proper for their young. Other animals, which at the time of birth cannot help themselves, are taken care of by their parents.

How great is the solicitude of birds, even before they lay their eggs! Each species has its peculiar mode of constructing its nest. How assiduously and patiently they sit upon their eggs for some weeks, scarcely allowing themselves time to eat their food! With what care they keep their young warm after they are hatched, and supply them with the necessary food! What courage they display in defending them from harm, often exposing themselves to danger whilst protecting their helpless little ones! Is it not also a very remarkable instinct in animals that induces them to cut the umbilical cord of their young with their teeth, and with such precaution as to prevent any loss of blood? How tenderly do they suckle them, and how carefully do they guard them from danger.

In general the instinct of all animals for the preservation of their young, is stronger than the desire of satisfying their own wants. They suffer hunger and thirst, refuse sleep and all indulgence, and even expose their own lives, rather than neglect their offspring. In this instinct which nature has given to animals we may observe a most admirable wisdom; for the preservation of every species depends upon the cares of the parents. That viviparous animals should have so much tenderness for their young is not so very remarkable, because they are their own flesh and blood; but that oviparous animals should have an equal solicitude for their eggs is truly wonderful.

Adorable Father of nature! Who does not here perceive and admire thy wisdom? Who does not acknowledge thy goodness in watching over the preservation of the animal world; making it subservient to our wants and to our pleasures? May the eyes of all be opened, so as they may behold more clearly the wisdom which shines so beautifully in all the works of the creation!

AUGUST XVII.

SENSIBILITY OF PLANTS.

Certain motions may be observed in plants, which makes it probable that they are possessed of sensibility. Some plants shrink and contract their leaves upon being touched; others open and shut their flowers at certain fixed hours, so regularly as to denote with precision the time of day; some assume a peculiar form during the night, folding up their leaves: and these different changes take place whether they are in the open air or shut up in close apartments. Those which live under water, during the time of fecundation, raise their flowers

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above the surface. The motions of a marshy plant discovered some time since in the province of Carolina are still more singular. Its round leaves are furnished above and on the sides with a multitude of notches that are extremely irritable. When an insect happens to creep upon the superior surface of the leaves, they fold up and enclose the insect till it dies; the leaves then open of themselves. We may daily observe regular motions in some plants in our gardens. Tulips expand their petals when the weather is fine, and close them again at sunset, or during rain. Vegetables with pods, such as peas and beans, open their shells when dry, and curl themselves up like shavings of wood. Wild oats, when placed upon a table, will move spontaneously, more especially if warmed in the hand. And the heliotrope, or sunflower, with various other plants, always turns towards the sun.

These are incontestable facts, of the certainty of which every person may be readily satisfied. From them, some have concluded that we ought not to deny sensibility to be an attribute of plants; and certainly the facts which are alleged in favour of such an opinion give it great appearance of probability. But, on the other hand, plants have no other sign of sensibility; and all that they have is entirely mechanical.

We plant a shrub, and destroy it, without finding any analogy between it and an animal. We see a plant bud, blossom, and bear seed, insensibly, as the hand of a watch runs round the points of the dial. The most exact anatomy of a plant does not unfold to us any organ which has the least relation to those of animal sensibility. When we oppose these observations to those from which we might infer the sensibility of plants, we remain in uncertainty, and cannot explain the phenomena related above. Our knowledge upon this subject is very imperfect, and is confined to simple conjecture. We can neither attribute sensibility to plants, nor deny it to them, with certainty.

Let us then rest satisfied with ascribing unto our Creator the glory that is his due; and be convinced, that whether plants have sensibility or not, whatever be the principle of the phenomena of which we have been treating, the arrangements of nature with respect to these and all other things are dictated by wisdom and infinite goodness. We have great cause to be content with the little we have yet discovered in the vegetable kingdom, though we were to learn no more; and though the particular point in question still remains obscure and doubtful, what we already know is sufficient to gratify our curiosity and inspire us with the love of God. Let us only endeavour with earnestness to apply the knowledge we already possess to useful purposes, without perplexing and entangling ourselves in the mazes of speculation, always more curious than beneficial; and without being anxious to obtain that information which our limited faculties do not permit us to acquire, and which it is perhaps reserved for future ages more enlightened to discover.

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AUGUST XVIII.

FEAR OF STORMS.

At the season in which nature presents to our view the most delightful scenery, and every thing abroad conspires to procure us joy and felicity, there are some people who still murmur and complain. They say the summer would be very pleasant if storms did not so often disturb the harmony of nature, and stifle every sentiment of joy in the heart. This fear of storms and thunder is principally founded upon the opinion that they are the effects of the wrath of Heaven, and the ministers of an offended God. For if such people considered how much storms contribute to purify the air from various noxious exhalations, and that they increase the fertility of the earth; if they did but employ the necessary precautions to shelter themselves from the dreadful effects of thunder; storms would lose their terrors, and would be regarded as benefits, more calculated to inspire gratitude than terror.

It may however be objected, that thunder and lightning often occasion great devastation; that they have often struck men and animals, and destroyed towns and villages. To this we may reply, that in this, as in many other things, fear often increases the danger, and magnifies the evil. To be convinced how rarely it happens that people are killed by lightning, we have only to be informed that out of seven hundred and fifty thousand persons who died in London during the space of thirty years, only two were destroyed by lightning. We may also observe that during a thunder-storm the generality of people prolong their fears without any real necessity. He who has time to fear, and be alarmed at the effects of the lightning, is already out of danger; for as that is the only thing which can be fatal to us, the moment we have seen it, and remain unhurt, we are safe; as the roar of the thunder which soon follows, whether rolling at a distance, the peals break upon our ear, or bursting with a sound that seems to rend asunder the concave of heaven, immediately above our heads, is harmless as the echo that dies on the breeze.

If by reflecting upon the cause of these phenomena our fear does not subside, the surest means of preserving our firmness and strength of mind is by endeavouring to acquire a good conscience. The soul that is just and pure firmly relies upon the merciful goodness of his God, and calmly reposes amid the convulsions of nature. 'He hears, without dread, the thunder roll. His Creator, the God whom he loves and adores, directs it; and knows when to terrify, and when to strike: with storms and tempests He sometimes visits the hardened soul of the impious wretch that dares to deny his power, and dishonour his attributes.'

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AUGUST XIX.

SUMMER PRESENTS US WITH IMAGES OF DEATH.

A few weeks ago, when we walked in our gardens, we were surrounded with the most beautiful and pleasing objects, and every thing raised emotions of joy in our hearts. But now, every day diminishes the number of pleasing objects, or renders their appearance more uniform. The greatest part of the flowers which then beautified our gardens have disappeared, and we begin to have only faint traces of the once charming scenes which so ravished our senses. These revolutions in nature may be very instructive to us. There is a period in our lives in which all the charms of spring make gay and happy our moments, that swiftly glide away, whilst we are beloved and caressed by parents, fondly solicitous for our welfare, and anxiously expecting from our future conduct the rich fruit of all their tender cares. But how often is this hope deceived! Many a sweet floweret falls before the blossoms expand. Sickness withers our charms, and nips our opening beauties; and an early death changes hope into the gloom of despondency.

We see spring flowers which bloom till summer, then perish in a few hours. A very striking emblem of death! And scarcely a day passes in which some human being is not unexpectedly and without warning met by the unsparing messenger. The days of man are as the grass; he flourisheth as a flower of the field: the wind bloweth upon him and he is gone, and the place that knew him knows him no more.

We are now in that season in which the fervent rays of the sun induce us to seek repose in the refreshing shade of the groves. These cool sequestered retreats are favourable for serious reflection; and our thoughts will there sometimes be directed to the awful solemnity of the grave, where the just will be received as into a safe harbour from the tossings and dangers of a life of care and trouble.

The reaper prepares to cut down his corn; the sickle levels the tall ears on the right and on the left, and leaves behind it the fields empty and deserted. This is a just emblem of life: all flesh is as grass, and all the glory, all the honours and duration of life, as the flowers of the field: like them man flourishes for a time; and, when the Lord of the harvest ordereth, falls under the scythe.

Let us imitate the activity and industry of the bees; and as they are busied in collecting and preparing their honey from every flower that scents the air, may we also be ever diligent in amassing those treasures of wisdom and virtue, which will be our delight when age presses heavily upon us, and our great consolation in the final separation of the soul from the body!

The husbandman will soon assemble to collect the fruits of the earth, and deposite them in their granaries. The days of harvest are the most important of any in the year: but how much more solemn

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and momentous will be that great day, when the Creator of the universe shall himself collect the harvest; when the graves shall open, and deliver up their dead; when the Supreme Judge of nations shall say unto his angels, 'Gather the tares into bundles to be burned, but gather the wheat into my garner!' Upon this day of awful solemnity the righteous may meditate with joy and reverence: here they labour and travail, and weeping sow their seed in the ground; but the joyful day will arrive, when they shall carry their abundant harvest to the altar of God with songs of joy and of gladness.

Meditation upon death is proper to make this happy season still more useful and beneficial. When we consider death in its true point of view, far from regarding it as the enemy of our pleasures, we shall acknowledge that its contemplation ennobles our ideas, and increases our real felicity. When the image of death is frequently present to our minds, can we deliver ourselves up to riot and excess? Should we make an improper use of the gifts which God grants us, if we continually remembered that the hour must come, when we are to give an account of our stewardship to him whom no one can deceive? Would the blessings of this life possess our affections, if we considered how soon every thing must perish? If we considered that the evening will arrive and bring us ease and repose, should we murmur and repine at the burdens we bear through the heat of the day, or the sufferings to which we are subjected? Or, if we frequently meditated upon that better world, and those purer and more exalted pleasures in which the souls of the righteous shall find a sure resting-place, should we imagine that our chief happiness consisted in the enjoyment of this world, and the pleasures it can afford?

AUGUST XX.

CAUSES OF THE HEAT OF THE EARTH.

The sun, without doubt, is one of the principal causes of the heat of this globe; and the warmth of a particular place is owing to its relative position to the sun. When he is on the southern side of the earth, the inhabitants of the northern parts have not so much warmth as when he approaches the north pole. The same thing happens in the southern parts of the earth, when the sun is towards the north. In those climates where the sun is almost vertical, the cold is never so intense as to freeze the rivers and lakes; the heat being very considerable in those regions. It becomes also very fervent when the sun continues long above the horizon, and his rays fall for a length of time upon the same place. Hence it is that towards the poles, where the days are very long, the heat in certain countries is sometimes extremely intense. From all these circumstances it appears that the sun and his relative position to the earth is one of the chief causes of the heat in the open air.

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But this is not the only cause; for if this were the case, the heat of every summer should be equal, and the temperature of countries in the same climate should be always exactly the same. But neither of these is the case; for it is observed that upon the highest mountains, where even there are spacious plants, and upon these mountains other hills and more plains, it is much colder than in the lowlands and in the valleys. Even under the line, if we ascend from a plain where the heat is scarcely supportable, up a mountain several hundred feet high, we shall experience the most intense cold, and enter the region of snow and ice. It has also been remarked in winter, when during the day the cold has been very severe, it sometimes sensibly diminishes towards midnight, and then becomes temperate, although the sun's rays do not impart warmth to the atmosphere. This will prove then that there may be warmth in the air that is not immediately produced by the sun.

There are substances which emit sparks and take fire by friction and percussion. The axletrees of wheels not sufficiently greased will take fire when the carriages roll with great rapidity. Other substances will become warm and enkindle when mixed together. If a certain quantity of water be poured upon a truss of hay or straw, a degree of warmth will be produced. Bodies which undergo the process of putrefaction and of fermentation often acquire an increase of temperature. Even in the air the motion of certain matters may occasion mixtures, solutions, and combinations, which produce a great degree of heat. Thus we may conceive how heat may be produced in the open air. At first the sun is the principal cause of it: to the heat which proceeds from this body are joined that of several living creatures and combustible matters, that which comes out of the bowels of the earth, from the depths of the seas, and from warm mineral springs. This heat is often much increased by the fermentation that different bodies undergo, either upon the surface of the earth, or in the upper regions of the atmosphere, where they produce warm exhalations. When, therefore, the particles of bodies which float in the lower atmosphere, and which are capable of receiving and retaining heat, are warmed, and have not been cooled or dispersed by wind and rain, their heat gradually increases till it becomes intense; and diminishes when any of the above causes cease to act.

All these arrangements are worthy of the wisdom and goodness of God; they are beneficial to all the parts of the habitable world; and every climate enjoys all the happiness of which it is susceptible. But he who lives in a temperate climate most sensibly experiences the providential and guardian care of our Creator, who has distributed to us cold and heat, in the wisest proportion, with a mercy that claims our gratitude and love.

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AUGUST XXI.

DIVERSITY OF PLANTS.

The vegetable kingdom is particularly deserving of attention on account of the great variety in plants, with respect to their parts, fructification, and properties.

The manner in which fructification is performed in several plants is very obscure. We know very little of its process in mosses, mushrooms, and ferns. Some plants exhibit singular monstrosities. We see flowers which have no tops; there are some out of the middle of which other flowers spring. Certain plants, called sleepy plants, take a different situation at the approach of night from that which they had during the day. Others turn towards the sun; and some shrink and contract upon being touched. Some flowers open and shut at regular hours, or during particular states of weather; and some bud, blossom, bear fruit, and lose their leaves, earlier than others. Plants also differ according to the particular place in which they grow. They were all originally wild, that is, they once grew spontaneously without culture.

The Creator has assigned to plants that climate which best suits their particular nature, and where they will soonest arrive at perfection. But those which are exotics may be naturalized among us, and succeed very well, provided they receive a proper degree of warmth.

One of the most pleasing characteristics of plants is their great diversity of form. If we compare the most perfect species with those which are least so, or if we only compare together the different species of the same class, we shall be struck with admiration at the astonishing variety which nature has produced in the vegetable kingdom. If we only consider the numerous tribe of mushrooms, or the different species of plants termed imperfect, we cannot but admire the great fecundity of nature in these vegetable productions, which differ so much from all others that they can scarcely be ranked among the number of plants.

If we rise some degrees higher in the scale of plants, we contemplate with pleasure those which have stalks; from the grass which grows among stones, to that inestimable plant which is the chief source of our nourishment. We next observe the great variety of creepers; from the tender bind-weed to the vine.

Another most admirable thing in the garden of nature is, that in all this variety the most perfect harmony reigns. All plants, from the hyssop which grows on the wall to the cedar of Lebanon, have the same essential parts. A little herb is as completely formed as the most beautiful rose; and the rose as the most lofty oak. In all are observed the same general laws of growth and increase, and yet each species is distinct. Out of so many thousand plants, there is not one which does not possess a distinct character, properties, mode of

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receiving nourishment, of growing, and propagating itself. What inexhaustible riches we discover in their forms, colours, and proportions! What pleasure we receive from observing their varieties, and beholding the beauties of the vegetable kingdom! Our soul, delighted with the prospect, raises itself towards God, the Father and Creator of nature, whose bounty is every where manifest; whose power has produced all these plants, and whose wisdom has arranged them in order and beauty.

AUGUST XXII.

REFLECTIONS UPON THE ANIMAL KINGDOM.

The animal kingdom may be considered as a well-regulated state, in which is a suitable number of inhabitants, each having an allotted place; faculties necessary to perform their requisite duties, and rewards and punishments to excite them to action; with a sufficient protection against their different enemies. In this republic of animals, those which are the weakest, and they are by far the greatest number, are obliged to submit to the strongest; and all are under subjection to man, as the representative of the Deity. The inhabitants of the animal kingdom find in all parts of the earth a sufficiency of food and employment. They are dispersed in every direction, and their nature, constitution, and organs, are adapted to the different abodes assigned them.

Their employments are various, and tend either to increase their species, to provide for their subsistence, or to defend themselves against their enemies. All the parts of their bodies are adapted to their peculiar nature and functions. They possess certain instincts which compensate for their deprivation of reason; instincts which are diversified in various ways, according to their necessities; instincts for motion; instincts to enable them clearly to discern their food, to seize, and to prepare it; instincts to construct nests and suitable habitations; to propagate their species, to defend themselves, and to secure shelter from danger, &c.

In each class of animals there are some that live upon prey, seizing the individuals that superabound in other classes. Each species has its peculiar enemies; hence none of them increase too much, and a proper proportion is maintained. Animals that are weak, or have some defect, are commonly the first which fall a prey to others; decayed fruits and carcasses are devoured, by which means the earth is not troubled with them; the air is not infected; and the purity and freshness of nature are preserved untainted.

Beasts of prey have a structure adapted to their mode of life; they have great strength, agility, industry, and cunning. But that they may not destroy the whole tribe of animals, they are restricted within certain limits. They do not multiply so fast as other animals; and

they often destroy one another, or their young ones become the victims of savage rapacity.

Some animals sleep during the winter, and live upon the fruits of the earth. Weak animals are provided with the means of defence proportionate to their place of abode, and the dangers to which they are exposed; their natural weapons, their agility, their hiding-places, and their cunning, preserve them from destruction: and thus the proper balance is maintained between every species of the brute creation.

Animals are in some measure obliged to perform the functions assigned them; because upon this their comfort depends. They find their advantage in following the laws which nature has prescribed for them; and cannot transgress them without subjecting themselves to various evils. The class of mammalia are the largest in size as well as fewest in number, and they fulfil very important functions. Birds perform various offices; they eat superfluous grains, devour dead carcasses, and diminish the number of insects. The greater part of amphibious animals live upon prey. The least animals are the most numerous, and very voracious.

All that we see so admirable in the animal kingdom demonstrates the existence of a superior Being who is all-powerful, and infinitely wise. For who besides could have peopled this vast globe with so many living creatures of such different kinds, or provided them with all that is necessary to their life and well being? Who but an Omnipotent Being could have supplied all the wants of the numerous animals that exist? Or who else could have given them so much sagacity and industry; so much address and instinct; assign to each living creature its peculiar element; form all the limbs, joints, bones, muscles, nerves, and vessels; unite them with so much harmony and perfection, that each animal can perform its different motions in the manner best adapted to its particular manner of life, and the circumstances in which it is placed?

AUGUST XXIII.

DIVISION OF THE EARTH.

All the known world is divided into four principal parts; Europe, Asia, Africa, and America. Europe is the smallest. Its length from east to west is about three thousand miles, and its breadth from north to south about two thousand five hundred. Its inhabitants possess various countries in the three other quarters of the globe, and nearly half the earth is under their subjection. The Europeans traverse every part of the globe, and receive the produce of every clime. They are the most enlightened of any people upon the earth, and cultivate the arts and sciences with the greatest success. Europe is the only quarter of the globe that is every where cultivated, and co-

vered with towns and cities; the only part whose inhabitants support an uninterrupted commerce with each other, and who profess, with only some slight variations, the same religion. The three other quarters are inhabited by a number of different people, who have little connexion together, scarcely know one another, and differ as much in their manners as in their religion and mode of living.

Asia is the largest continent known; its length, from the Dardanelles on the west, to the eastern shore of Tartary, is four thousand seven hundred miles; and its breadth, from the southern extremity of Malacca to the most northern cape of Nova Zembla, is four thousand three hundred and eighty miles. As the countries situated in the interior of this part of the world are not visited by the refreshing sea-breeze, nor watered by many rivers—as they contain far extending plains and barren mountains, the heat and the cold are both extremely intense; the earth has scarcely any fertility, and is never cultivated.

At present these regions are only inhabited by people who dwell in tents, and lead a wandering life, which seems to be rendered necessary by nature. The more settled inhabitants of Asia often suffer from the restless unquiet disposition of these wandering tribes. The northern part, which is full of lakes, marshes, and forests, has never been regularly inhabited. But the southern, eastern, and western parts are the finest countries in the world; particularly those situated towards the south: they are most luxuriantly fertile, producing in lavish abundance every thing that is necessary for the comforts of life.

Africa is a peninsula of very great extent; stretching from Cape Bona north, to the Cape of Good Hope south, four thousand three hundred miles; and its breadth, from Cape Verd to Cape Guardafui, is three thousand five hundred miles. It is under the torrid zone, and containe vast sandy deserts, mountains of a stupendous height, forests burning beneath the ardent sunbeams, and monsters of every description. The excessive heat enervates all the faculties of the soul. We know very little of the interior parts of the country; and though so contiguous to Europe, very few well-regulated states have yet been discovered.

America, the largest division of the known world, and only discovered by Europeans within the last three centuries, is composed of two great continents, separated by a narrow isthmus, which is surrounded by a number of islands. The cold which reigns in the northern parts, the few useful productions found there, and its distance from inhabited countries, are the causes why it is not yet entirely known; but there is reason to believe that the natives are not civilized.

Forests and marshes still cover a great part of the country, and the eastern parts are the only ones cultivated. In South America there formerly existed considerable empires; the rest of the country was inhabited by wild people. The serpents, reptiles, and insects, are much larger than the greatest that are known in Europe. America contains the largest extent of country in the world, with proportion-

ably the fewest inhabitants. If we calculate the number of leagues contained in these four parts of the earth, they will seem very considerable; and yet altogether they will not amount to the fourth part of the whole globe, which, great as it is, appears small when compared with the immense bodies in the heavens. It may, however, justly be regarded as a vast theatre, where the wonders of God are continually displayed; and as we can know very little of the worlds around us, let us endeavour to become acquainted with that which we inhabit.

AUGUST XXIV.

OF THE NATURE AND PROPERTIES OF LIGHT.

Though we continually experience the utility of light, we cannot precisely determine its nature. All that the greatest philosophers have said of it is conjectural. Whether it is a fluid surrounding our earth, and which, to become perceptible, requires being agitated and put in motion by the sun or some other inflamed body; or whether it is fire itself, which by the emanation of its infinitely subtile particles gently strikes the eyes at a certain distance; is still a question among philosophers: though the former hypothesis seems to be the most probable and the best supported. There is certainly a considerable difference between fire and light, the latter being infinitely more subtile; it instantly penetrates glass and other diaphanous bodies, whilst fire does it much more slowly, which proves that the pores of glass are large enough to admit light to pass freely, but obstruct the less subtile particles of fire, which also move much slower than light. When burning coals are brought into a room, it is slowly and gradually warmed; but the instant a lighted taper is brought in, the whole apartment is suddenly illuminated. From this and some other facts, we may conclude that fire and light are different substances, though generally accompanying each other, and one often producing the other.

The properties and effects of light are very remarkable. The rapidity with which it passes is prodigious; being only seven or eight minutes in its progress from the sun to the earth; in this short space of time traversing several millions of leagues. The observations of astronomers farther inform us, that the rays of a fixed star, before they reach us, must traverse a space which a cannon-ball, shot with the greatest velocity, could not pass through in less than one hundred and four thousand millions of years. The expansion of light is not less astonishing. The space through which it is diffused is not less than the universe itself, and too great for the human understanding to comprehend. This boundless diffusion of light enables us to discover the very remote bodies in the heavens; and could we obtain glasses of sufficient power, we might discern those which are still more distant in the vast regions of space.

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Though our faculties are too confined to embrace all the designs of the Deity respecting the nature and properties of light, by investigating it with attention we may obtain considerable information upon so important a subject. Why, for instance, does light move with such velocity, and penetrate every part, but that a variety of objects may be perceived at the same time by a great number of people, and that distance may not prevent their being seen? If the propagation of the rays of light was slower, great inconveniences must result to the inhabitants of the earth; the force and splendour of light would be much diminished and enfeebled; the rays much less penetrating; and darkness would slowly and with difficulty be dissipated. Why are the particles of light so extremely subtile, but to paint the minutest objects upon the retina? Why have they not more density, but that they may not dazzle us by their splendour, and injure the eye by their power? And why are the rays so refracted, if not to enable us more easily to distinguish objects?

Thus we find the Creator and Parent of mankind ever operates for our good and advantage, and all his arrangements are wise and beneficial. Had he not created light, we could not have enjoyed life; we should have been deprived of every external source of pleasure, and our understanding and improvement must have been reduced within very narrow limits.

AUGUST XXV.

STRUCTURE OF BIRDS.

Birds may unquestionably be ranked among the most beautiful creatures of the earth. The form of their bodies, even in the minutest particulars, is so perfect and regular, as at once to convince us of the wisdom of the Creator. They have bones like the mammalia, but they are differently clothed. Their bodies are covered with feathers fastened to the skin, lying upon each other in regular order, and furnished with a warm and soft down. The large feathers are covered above and below with smaller ones, and each consists of a quill and beard. The lower part of the quill is hollow, and by it the feather receives its nourishment; toward the top it contains a kind of marrow. The beard is a range of small thin flakes, closely connected at the edges. Instead of having fore-legs like a quadruped, birds have wings composed of eleven bones, in the muscles of which the feathers enabling them to fly are fixed. The structure of these wings is very curious, and admirably adapted to their purpose. Between them the body is perfectly balanced, and placed in the most convenient manner for the different motions it has to perform. The heads of birds are small; by which neither the action of the wings nor the progress of the birds through the air is retarded. Their tails are useful in pre-

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serving their balance whilst flying, and to assist them to ascend and descend in the air. Their legs, from their particular situation, are well adapted to preserve the centre of gravity; and in some birds they are placed so far back as to enable them to swim. The thighs are clothed with muscles and feathers, whilst the legs are generally thin and without covering. Most birds have four toes, three before and one behind; at the end of which are claws, which they use to seize their prey and food. Some birds feed upon animals; others on plants, grains and fruits, which they steep and soften in their crop; whence only a small part of the aliment passes at a time into the stomach, which in this species of birds is very small, and composed of very strong muscles; these assist in grinding the food, and small stones or gravel are also swallowed to promote digestion. The stomachs of birds of prey are much weaker.

All birds are constructed with such wisdom, that they are enabled to pursue their particular mode of living and obtaining food with great facility. The stork and the heron, which obtain most of their food in marshy places, have a long beak and long legs, that they may run in the water and readily seize their prey. The eagle and the hawk, which only live by rapine, are provided with large wings, strong claws, and sharp beaks. The bill of swallows is small and pointed, and their mouth large, to enable them to catch the insects which they meet when flying. The swan has a reservoir in its windpipe, whence it draws air while its head and neck are plunged under water seeking its food. Many small birds, which fly and hop among thickets, have a membrane over their eyes to defend them from injury. Each is perfect in its kind, and admirably constructed. The variety is very great and beautiful; and we must always admire the wisdom of God in this part of the creation, which we contemplate with such peculiar delight.

AUGUST XXVI.

REFLECTIONS UPON THE SKY.

Whoever attentively regards the heavens must be struck with admiration at the view of this magnificent work of the Creator. How beautiful is the azure vault suspended above the earth; in the day variegated by clouds, and by night resplendent with thousands of stars, and luminous with the moon's silvery radiance! We contemplate this grand spectacle with awe and sublime emotion; we consider with wonder the immensity of space, whose beginning and end we cannot discover, where orbs innumerable, of different degrees of magnitude, roll their spheres one beyond another in their prescribed circles, till distance forbids the eye to penetrate farther in the boundless expanse; and the mind owns its limited powers, whilst it ponders in

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silent astonishment upon the Supreme Being who made the heavens and the earth.

AUGUST XXVII.

MORAL REFLECTIONS UPON A FIELD OF CORN.

As the corn-field, often threatened with danger, and exposed to the rude visitation of the tempest, is yet preserved in safety to yield its rich stores to the husbandman; so the human mind, visited by affliction, and shaken by the storms of adversity, still bears up against the blast, and is strengthened and purified by the fierce contention. In the moments of sorrow, when care and trouble oppress us, our knowledge, faith, and humility, are increased and confirmed; for though like the tender stalk of corn we bend whilst the blast sweeps over us, the compassionating hand of God gently raises and consoles our afflicted hearts.

The time of harvest approaches, the corn ripens fast, the sun's warmth and soft showers descend to hasten its maturity. May we also, as each succeeding day brings us nearer to our end, become more mature in all good, and prepare to be gathered unto our fathers in eternal glory. Whatever be our situation in this state of existence, whether cheered by prosperity, or darkened with impending evils; may all our actions tend to the glory of God, and the promotion of piety.

As those stalks which bear the largest and finest ears of corn bend beneath their treasure, whilst those which are poor and light stand erect and overlook the field; so we may observe men, vain and presumptuous, without knowledge and virtue, proudly hold up their heads, and contemptuously look down upon those whom religion teaches to be humble, and whose learning has estimated the limits of human attainment, and the insignificance of vanity.

All the corn which is to be reaped is not equally good; tares and weeds are mixed with it; and so with men, they blend together both good and bad qualities; and their natural corruption often retards their progress in virtue. The dissipated and the wicked, by their pernicious examples, often sow tares in the field, where none but good seed ought to grow. The master of the field permits them to remain for a season, and patiently waits the arrival of the harvest, before he exercises that impartial justice which separates the good from the bad.

The sickle mows down the corn, and the fruits of the earth are joyfully gathered. Death levels with the dust the rich and the poor, the high and the low, the wicked and the righteous; and happy will be the hour in which those who have preferred the pure light of religion to the delusions of error, are received into the regions of glory, and numbered among the spirits of just men made perfect. They will gratefully remember the storms, the dangers, the trials, and the

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afflictions through which they have been preserved, and they will joyfully unite with angels in glorifying the God of Heaven.

AUGUST XXVIII.

SHELL-FISH.

Shell-fish, or testaceous animals, form a very considerable part of the animal kingdom. They live in shells formed of a calcareous matter. These are either univalve, of one piece; or bivalve, and multivalve, of two or several pieces. Testaceous animals form two great families: that of muscles, the shells of which are of more than one piece: and that of snails, whose shell is of one piece, and spiral. The structure of the former is the most simple. Muscles have neither head, horns, nor jaws: a mouth, windpipe, and sometimes a species of foot, is all that can be distinguished in them. The greater part of the snail species have, on the contrary, a head, horns, eyes, and a foot.

Shell-fish differ considerably in their mode of generation. In some the sex may be discovered; others are hermaphrodites; and in some no particular sex can be distinguished. Some are oviparous; others viviparous. They are born with their shell; and as they grow, the shell, the interior of which is lined with a fine membrane, increases both in thickness and circumference. The shells are formed by a viscous liquid which exudes from the animal, and gradually thickens and becomes harder. Shell-fish live both in fresh water and the sea; near the shore as well as in the main ocean: some are carnivorous, and others eat vegetables: some keep at the bottom of the sea, or adhere fast to the rocks. Oysters, and some others with hard shells, attach themselves to different bodies, and remain firmly united to them by means of a glutinous gritty liquid: and they are often cemented fast to each other. This adhesion is voluntary in some shell-fish, which have the power of fastening themselves as occasion may require: but in others it is involuntary; and they always continue to the rocks on which they first fastened.

The knowledge that we have of these various animals is still very imperfect. As they generally live below the surface of the water, it is difficult to make exact observations upon their structure, mode of receiving nourishment, of propagating, and of moving, &c.; and as yet very few classes of them are known. But little as is our acquaintance with them, it is sufficient to make us admire the infinite grandeur of God. How immense is his empire! We every where find creatures which testify his power and wisdom. How beautiful is the variety we observe in the form, richness, and colour of shells, which human art can never equal!

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AUGUST XXIX.

UPON THE GOVERNMENT OF GOD.

A God, who from his supreme elevation, could be an indifferent spectator of all the revolutions which take place in the world, would not be worthy of our homage. Happily for us, the government of our God whom we adore embraces the whole creation. We every where find the centre of his empire, but can no where discover its limits. All his works are continually before his view: he at once perceives the past, the present, and the future; and comprehends all their bearings and dependences. Nothing, however trivial and minute, escapes his notice; every thing concurs to perfect the plan he has formed, and to complete his wise purposes, which all tend to the advantage and felicity of his creatures. All his laws are uttered in wisdom, and his commandments are a source of joy and happiness.

God, by his providence, preserves every creature which he formed in the beginning of the world. As one animal dies, another supplies its place; and one generation of men succeeds another. The master of the world makes use of inanimate creatures to preserve those which live; he subjects all to man, who, of all created beings, is the only one that is capable of knowing and worshipping the infinite God; who, all pure and holy himself, also wills that his rational creatures should know and feel the beauty of holiness. By the continual proofs which he gives them of his love for goodness, and abhorrence of evil, he speaks to their hearts, and unceasingly exhorts them to walk in the path of virtue; to this end he directs their actions, renders their designs abortive when they are contrary to his merciful views, and offers them the means of avoiding the snares of iniquity.

How infinitely wise were the measures which he used to conduct the children of Israel to the blessed ends that he proposed! In vain did the nations wrapped in idolatry oppose the progress, and conspire the destruction of a people who marched under the eternal banners of their God, and followed a pure and holy religion, which pre-eminently distinguished them from, and raised them above, all the surrounding nations, blinded by superstition, and persisting in their errors.

The God of our faith dwells in light inaccessible; the wisdom of his government is too profound for human nature to penetrate; our understanding is not capable of comprehending all his plans, or to form just ideas of his views before the event has unfolded them; and our knowledge is too limited to scan the counsels of an infinitely wise Being, and to discover beforehand the motives of his conduct and dispensations. The seat of the wicked is often with princes, whilst the righteous man hides his head in the dust: villany triumphs, and integrity is oppressed; fortune smiles upon iniquity, and the friend of religion experiences disappointment and adversity. Yet there is a Providence, a Father tender of his creatures, a God infinitely wise, a King just and righteous. All his dispensations are worthy of adora-

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tion, however impenetrable they may appear. His counsels are marvellous, his plans past finding out; but they are always formed and executed with supreme wisdom: and let us in silent reverence adore our God, and question not his ways, though affliction may visit, and misfortune bear heavy upon us.

AUGUST XXX.

HARVEST HYMN.

Our fields, crowned with blossoms and ears of corn, are as a hymn of praise to the Creator; the joy which sparkles in the eyes of the reaper is a hymn to the God of nature. It is he who causes bread to spring out of the earth, and who loads us with his blessings. Come, let us assemble and sing unto our God; let his praise ever be the subject of our songs; let us listen to the glad voice which rises from the bosom of our fields, 'the year shall crown thee with its blessings, O world, whose happiness is my work. I have called forth the spring, the harvest is the work of my power; the fields which support thee, and the little hills covered with corn, are mine.' O Lord, we behold thy majesty, and feel the value of thy beneficence. By thee we exist; our life and preservation are thy gifts. Blessed be the fields that nourish man! Flourish, ye beautiful meadows! Be covered with thick foliage, ye forests! And thou, great God of nature, be ever beneficent towards thy creatures, and suffer thy children to repeat—the God of heaven is their Father!

AUGUST XXXI.

THANKSGIVING FOR GOD'S PROVIDENTIAL CARE OF HIS CREATURES.

Lord God! my redeemer, my rock, and sure protector! Thou alone art worthy to receive glory, honour, and praise! My soul blesses thee, and I will declare thy wonders. I will rejoice and be glad in thee, and will celebrate the name of the most high God.

I thank thee for that immortal soul which thou hast given me; which thou hast redeemed by thy blessed Son, and sanctified by thy grace.

Eternal Source of life and happiness! it is by thee that I exist, and I will for ever bless thy holy name. I thank thee for that parental care which provides my daily support, and for all thy numberless blessings. I thank thee for those dear connexions thou hast enabled me to form; and for the glorious hope of finally experiencing, when my mortal career is terminated, the blessed inheritance of the just in the everlasting kingdom of joy and celestial beatitude, where

my now feeble accents will join the loud anthem swelling from myriads of angels that harmonious sing thy praise in endless felicity.

SEPTEMBER I.

HYMN IN PRAISE OF THE MOST HIGH.

Sing with holy rapture, sing a new song to our God. The Lord is great! Let us for ever celebrate that Being who is all good, all wise, and from whose eyes nothing can be hid.

He has extended the starry sky, as a pavilion over our heads. There, encompassed by the radiance of innumerable suns, he has established his throne; there he dwells in light inaccessible to mortals.

O God, I am lost in this splendour: but thou, in thy infinite goodness, art continually present. Ravished with the wisdom of thy ways, and penetrated with admiration, I praise and exalt thy holy name.

I glorify thee, who governest the earth with paternal care, who enlightenest it by the beams of the star of day, who waterest it by the rains, who refreshest it by the dew.

Thou coverest it with smiling verdure; thou crownest it with flowers; thou enrichest it with harvests; and thou renewest its ornaments and blessings year by year.

Thy cares extend to all that exists, and the least of thy creatures is the object of thy benevolence. The young raven, which cries to thee from the summit of the snow-capped rock, is sustained by thy hand.

Thou commandest the cooling stream to flow from the bosom of the desert mountains: thou orderest the sun to mature the vines which adorn our hills, and to ripen the fruits which enrich our orchards; thou sendest the breeze through our forests.

When thy sun arises to enliven the world with the splendour of his fires, he invites thy creatures to labour; every thing is active in nature till the moment in which the shade and the silence of night bring the desired repose.

But when the day begins to dawn, the choir of birds breaks the stillness of the grove with songs of gratitude and joy: then all the nations of the world, all the regions under heaven, lift up one concert of praise unto thee.

To thee they raise the voice of thanksgiving, Father of all beings! thou lovest them all, thou loadest them with thy gifts, thou hast designed all men for happiness, provided that they themselves wish to be happy.

May thy name be glorified throughout all the worlds which form thy empire! and let every voice conspire in one universal hymn to extol thee, the all-wise, the all-beneficent Deity!

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SEPTEMBER II.

THE OMNIPRESENCE OF GOD.

Thou art every where present, O Almighty God! Yes, thou art here, thou art afar off, thou fillest the universe. Here grows a flower; there shines a sun; thou art there, thou art also here. Thou art in the breeze and in the tempest; in the light and in the darkness; in an atom and in a world. Thou art here in this flowery valley; thou lendest thine ear to my feeble accents, and thou hearest from the foot of thy throne the sublime songs which accompany the harps of the seraphim. O thou, who art the God of the seraphim; thou art also my God, thou hearest also the joyful notes which pervade the air from yonder lark, and the humming of this young bee which flutters on the rose. Omnipresent Being, as thou hearest me, deign likewise to grant my request; may I never forget that I am in thy sight; may I always think and act as being in thy presence, to the end that when summoned to appear at the tribunal of my Judge with the whole world of spirits, I may not be constrained to flee from before the face of the Holy of holies.

SEPTEMBER III.

THE BEAUTY AVD VARIETY OF BUTTERFLIES.

Let us observe these beautiful creatures whilst they yet enjoy their transitory existence; the examination may perhaps be interesting both to the mind and to the heart.

The first thing which attracts our attention on beholding these aerial inhabitants, is the clothing with which they are adorned. Yet some of them have nothing very striking in this respect to engage our notice; their vestment is plain and simple; others have a few ornaments on the wings; but with some those ornaments amount to profusion, and they are covered with them all over. Let us reflect awhile upon this last species. How beautiful are the gradations of colour which decorate them! What harmony in those spots which relieve the other parts of their attire! With what delicacy has nature pencilled them! But whatever may be my admiration when I consider this insect by the naked eye, how greatly is it augmented when I behold this beautiful object through the medium of the microscope! Would any one ever have imagined that the wings of butterflies were furnished with feathers? Nothing however is more true, and what we commonly call dust is found in reality to be feathers. Their structure and arrangement are as full of symmetry as their colours are soft and brilliant. The parts which form the centre of those little feathers, and which immediately touch the wing, are the strongest;

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those, on the contrary, which compose the exterior circumference are much more delicate and of an extraordinary fineness. All these feathers have a quill at their base, but the superior part is more transparent than the quill from which it proceeds. If we lay hold of the wing too rudely, we destroy the most delicate part of the feathers; but if we remove all that we term dust, there remains only a thin transparent skin, where may be distinguished the little orifices in which the quill of each feather was lodged. This skin, from the nature of its texture, may be as easily discerned from the rest of the wing as a fine gauze from the cloth on which it is fastened: it is more porous, more delicate, and seems as if embroidered by the needle; to complete its beauty, its extremity finishes by a fringe whose minute threads succeed each other in the most regular order.

What are our most elegant dresses, what is all their boasted ornament, in comparison of that refined tissue with which nature has invested this simple insect? Our finest laces are only like coarse cloth when brought to vie with that luxuriant clothing which covers the wings of the butterfly, and our smallest thread, compared with their infinitely delicate fibres, appears like hempen cord. Such is the wonderful difference to be observed between the works of nature and those of art, when viewed through a microscope. The former are finished to all imaginable perfection; the others, even the most beautiful of their species, appear incomplete and coarsely wrought. How fine a piece of delicate cambric appears to us! Nothing more slender than the threads, nothing more uniform than the texture; and yet, in the microscope, these threads resemble hempen strings, and we should rather be tempted to believe that they had been interlaced by the hand of a basket-maker, than wrought on the loom of a skilful weaver.

What is most astonishing in this brilliant insect, is, that it proceeds from a worm whose appearance is mean and vile. Behold how the butterfly displays its gay wings before the sun; how it sports in his rays, how it rejoices in its existence, and flutters from flower to flower. Its wings present to us the magnificence of the rainbow. How beautiful is the butterfly now, which but a little while ago crept in the form of a worm in the dust, in perpetual danger of being crushed to death! Who has raised it above the earth? Who has given it the faculty of inhabiting the ethereal regions? Who has furnished it with its painted wings? It is God; that sovereign Lord who is its creator and mine. In this extraordinary insect we are presented with an emblem of that transformation which awaits the righteous. Yes, the day will come, when quitting their present form, they shall cease to grovel upon the earth; when, holy and glorious, they shall be lifted above the clouds, and, nothing limiting their flight, they shall soar beyond the stars.

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SEPTEMBER IV.

THE GROWTH OF TREES

Every tree, however luxuriant its branches may be, receives its principal nourishment from its lower parts; and it is probable that its juices circulate in a manner analogous to that of the blood in animals. The extremities of the roots form a prodigious mass of spongy fibres and of globules of air, which are constantly open to imbibe the juice which the earth affords them. This juice is at first only water impregnated with earthy matter; then, by means of a sort of milky substance, which is peculiar to each tree, and which distinguishes it from others, the juice acquires a nutritive quality before it ascends into those parts of the tree which are elevated above the surface of the earth. We find, by the aid of the microscope, that wood, notwithstanding its hardness, is nothing more than an assemblage of an infinite number of minute, hollow fibres. The greater part of them, especially in shrubs, ascend perpendicularly; but in order to give more consistence to these fibres, there are in certain trees, particularly in such as are designed to be more strong and hard, tubes which extend horizontally from the centre to the circumference. Influenced by the heat of the sun, the sap rises, by degrees, into the branches and into all their minute and multiplied ramifications; in the same manner as the blood, issuing from the heart, is carried by the arteries and the veins into the most distant extremity of the animal body. When the sap has been sufficiently diffused through all the parts which required its circulation, the remainder of it fills certain large vessels which are placed between the inner and outer bark; and hence arises the annual growth and consequent thickness of the tree. To be convinced of this, it is sufficient to cut a branch transversely, by which we shall ascertain the age of the tree. Whilst the trunk from time to time increases in height and bulk, the roots continue a proportional growth, and gradually strike a deeper hold and multiply their supporting fibres. As to the exterior bark, it seems destined to serve as a kind of garment to the tree, to unite securely together its component parts, and to preserve its more delicate but essential ones from external accidents, and from the inclemency of the air.

Thus has the all-wise Creator formed an admirable system of solid and fluid matter in order to give life and growth to those trees which adorn our plains, which lend their friendly shade to our flocks, to our shepherds, and to our cottages, and which afterward serve so many purposes useful to man. Here we discover a wisdom which never fails, whilst it prescribes to nature laws in certain prospects, immutable, which act without interruption under the eye of Providence. A wisdom so profound, a skill so marvellous, so many preparations and combinations for each tree, ought to excite us more and more fervently to admire and venerate the creative hand. The contemplation of this wisdom is a most delightful study, and we shall find

ourselves animated by it to glorify that God, who is so great in his counsels and plans, and so wonderful in their execution; the more we discover the traces of this wise Providence, the more shall we be impelled to commit all our interests into the hands of him who can never want means to turn every thing to the good of his creatures; the more, in fine, shall we be encouraged to raise our affections towards him, to supplicate him to enrich our souls with the gift of wisdom, and to make them grow in grace.

May we, in our moral and intellectual progress, resemble the growth of the trees! As they from year to year put forth new shoots towards heaven, as they extend around them fresh branches, laden with leafy honours, and with the richer burden of nutritious fruits, so may our souls be gradually elevated to more heavenly heights! May they attain a continually increasing light, and in their intercourse with mortals present a succession of virtues which shall for ever augment in brightness and in power! Whilst we are thus internally fortified to bear with firmness the storms of life, and whilst we are taught to receive them with salutary humility, as visitants kindly sent from heaven to loosen us from the world, may we never find an emblem of our state in the ancient tree, which, in proportion to its age, always attaches itself the more strongly to the earth!

SEPTEMBER V.

THE ANT-LION.

No insect is more remarkable for its dexterity than the ant-lion, though its figure announces nothing extraordinary. It nearly resembles the woodlouse; its body, which is composed of several membraneous rings, and terminated in a point, is provided with six feet. Its head, flat and square, is armed with two moveable, crooked horns, whose singular structure shows how admirable nature is, even in the least of her works.

This insect is the most subtle and dangerous enemy the ant has; the plans which he forms to ensnare his prey are very ingenious. He mines a portion of earth in the form of a funnel, at the bottom of which he waits to seize the ants which coming by chance to the edge of the precipice, are thence hurried down to their merciless foe. In order to dig it, he first traces in the sand a circular furrow, whose circumference forms precisely the mouth of the funnel, the diameter of which is always equal to the depth he gives to his ditch. When he has fixed on the size of this opening, and traced the first furrow, he digs a second concentric to the other, in order to throw out all the sand contained in the first circle. He performs all these operations with his head, which serves him instead of a shovel, and its flat and square form admirably adapts it to this purpose. He also takes some sand with one of his fore-feet to throw it beyond the first furrow; and

this work is repeated till the insect has reached a certain depth of sand. Sometimes in digging he meets with grains of sand larger than usual, or with little bits of dry earth, which he will not suffer to remain in his funnel; of these he disencumbers himself by a sudden and well-timed manœuvre of his head. Should he find particles yet larger, he endeavours to push them away with his back, and he is so assiduous in his labour that he repeats it six or seven times.

At length the ant-lion begins to enjoy the fruits of his toil. When his nets are once well laid, he has nothing to do but to put himself on the watch; accordingly, motionless and concealed at the bottom of the ditch which he has dug, he patiently waits for the prey which he cannot pursue. If any ant is inadvertently drawn to the borders of this fatal precipice, it generally rolls down to the bottom, because the brink is made sloping; and thus the sand giving way beneath its feet, the little insect is forced to follow the dangerous declivity till it falls into the power of its destroyer, who, by means of his horns, draws it under the sand and feasts upon its blood. When he has sucked all the juices from the body, he contrives to eject from his habitation the dry and hollow carcass; repairs any damage his trench may have sustained, and puts himself again in ambush. He does not always succeed in seizing his prey at the moment of its fall; it frequently escapes him, and endeavours to remount the funnel; but then the ant-lion works with his head and causes a shower of sand to descend upon his captive, and precipitate it once more to the bottom.

All the actions of this little animal display an art so extraordinary, that we might long examine them without being wearied. The ant-lion employs itself in preparing trenches even before it has seen the animal which it is to ensnare, and which is to serve for its nourishment; and yet its actions are so well regulated, that they could not be better adapted to accomplish these purposes.

How would an animal, so destitute of agility, have been able to entrap its prey more easily, than by digging in a moveable sand and giving a sloping declivity to the funnel? What better stratagem could it have devised for covering the ants which were on the point of escaping, even from this skilfully constructed snare, than in overwhelming them with showers of sand, and thus cutting off all hopes of a retreat? All its actions have fixed principles by which they are directed. The trench must be dug in the sand, or it could not answer the desired purpose: he must, according to the structure of his body, work backwards, and use his horns like a pair of pincers, in order to throw the sand over the brink of the funnel. The instinct which governs this insect discovers to us a first cause, whose intelligence has foreseen and ordained every thing that was necessary for the preservation and well being of such an animal. The skill, which it evinces is not the fruit of experience and of exercise; it commences with its existence. We must therefore seek its origin in the wisdom, the power, and the goodness of that Supreme Being, who has proportioned the instinct of animals according to their several wants.

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These considerations offer a new encouragement to glorify him, who is the Creator of man as well as of the minute insects we have been contemplating! Beneficent source of life, thou lovest to diffuse it abroad, and thou hast formed this humble receptacle of it in such a manner that its existence shall be blessed; thou hast furnished all the means requisite to its enjoyment of life, and by the instinct with which thou hast endowed an animal, otherwise so impotent, it arrives at a skill which approaches to reason, and in some measure even surpasses it! And what has been the design in all this, but to furnish us, even by the most despicable creatures, with opportunities of knowing thee? To this purpose let us devote our studies of nature; and then every branch of them, however insignificant their objects may appear, will elevate our thoughts towards thee, who hast created the small worm as well as the huge elephant, and who extendest thy cares with equal benignity to the one and to the other.

SEPTEMBER VI.

CONFORMITY BETWEEN PLANTS AND ANIMALS.

It is often extremely difficult to determine the precise difference between plants and animals. Nature descends by imperceptible degrees from animal to vegetable existence; and, to distinguish the exact limits of these gradations, nothing short of an angel's penetration would suffice. And we may remark, that, notwithstanding all the differences between these two species of organized bodies, we may still find in them much resemblance.

The seed is to the plant, what the egg is to the animal. From the former springs the stalk which was before concealed under its coats; and this stalk makes an effort to raise itself out of the earth. In like manner, the animal, enclosed in the egg, breaks the shell, in order to breathe the open air. The eye or bud of the tree is in the vegetable, what the embryo is in the animal kingdom: this eye does not pierce through the bark till it has acquired a certain thickness, and it then remains attached to it in order to receive nourishment from it as well as from the fibres of the plant.

The embryo, at the end of the appointed time, comes forth from the womb; and would soon perish, were it not sustained by its mother. The plant is supported by the alimentary juices which are brought to it from without, and which passing through various channels, are at length changed into its own substance. The nourishment of the animal is affected in a similar manner. It also receives its nourishment from without, and after having passed through different vessels, is transformed into animal substance.

The fecundation of the germ takes place in the vegetable kingdom when the dust of the stamina penetrates into the pistils; and fecundation among animals is produced when the seminal liquor penetrates

into the ovaries or matrix. The multiplication of plants is effected not only by seed and by ingrafting, but also by slips. In like manner animals are propagated, not only by laying eggs, and bringing forth their young alive; but also by slips, as in the case of the polypus.

The diseases of plants arise from causes sometimes external, sometimes internal; and it is the same with those of animals. To conclude, death is common to them both, when old age, having hardened and obstructed the vessels, the circulation of the juices is necessarily stopped. Plants and animals are situated in the same places. The earth, both on its surface and within its bosom, the air, the sea, and the rivers, are alike filled with animals and with plants. Both are extremely numerous, though animal rather than vegetable forms seem to bear the preponderance.

Thus one might be almost tempted to believe that animals and plants were beings of the same class, since nature seems to pass from one to the other by imperceptible degrees, and that even when she has risen by this gradation to the most obvious difference, she still connects the two orders together by a very striking similarity in all her principal operations. Of this at least we are certain, that some general and essential resemblances have been found in the two kingdoms; but that hitherto the truly characteristic differences have never been clearly ascertained. And though some should be discovered which have not yet been observed, we must always acknowledge that nature diversifies her works by gradations so fine and delicate, that the human mind can with difficulty discern them. And who knows what discoveries may be reserved for posterity? Perhaps futurity will bring to light plants whose properties will approach still nearer to those of animals; perhaps some animals may be discovered which, even more closely than the polypus, will be allied to the class of vegetables.

Let us endeavour to make that use of these facts for which all the truths of nature and of revelation are designed, even to draw from them continued incitements to glorify God and to strengthen our minds in virtue. Let the great resemblance which we find between animals and plants, render us sensible to the power and wisdom of that Being who, on all his creatures, has in some measure impressed the character of infinity. But, O man, learn to be humble. Thou participatest in the nature of plants, and in that of animals; to Jesus alone thou art indebted for thy elevation, and a much higher affinity, art lifted up from thy corporeal relation with the beasts that perish to a spiritual union with angels, whose perfections thou art called upon to imitate, with assurances that thy endeavours will be rewarded with a perpetual approximation towards their excellence.

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SEPTEMBER VII.

THE NATURE AND PROPERTIES OF SOUND.

Sounds are produced by means of the air; but it is necessary for this purpose that the air should be put into motion. Not that the agitation of the air alone occasions a sound, for in that case all wind would be attended with a noise. To produce sound, the air must be suddenly compressed, that it may afterward dilate and expand itself anew by its own elastic force. Thus a sort of tremulous undulation takes place, something similar to those waves and concentric circles which appear on the water after a stone has been thrown into it. But if this undulatory movement took place only in those particles of air which are compressed, the sound would not reach our ears. It is necessary, therefore, that the sonorous body, after having made its impression on the air contiguous to it, should continue the impression from particle to particle, in a circular direction to all parts.

By means of this propagation, the last vibration is communicated to the air immediately surrounding our ear, and we have then the perception of sound. With such amazing celerity is this chain of successive motions formed in the atmosphere, that sound is known to travel at the rate of a thousand feet in the space of a second, and in consequence, a German league in twenty seconds. This calculation, which has been verified by a multitude of experiments, may be useful in many cases; the knowledge of it contributes to our security in teaching us how far the thunder is distant from us, and consequently in apprizing us of our danger or safety in the place where we hear it roll. We have only to number the seconds, or to count the strokes of our pulse between the flash of lightning and the clap, and we may immediately ascertain the precise distance of the thunderbolt. By the same means we may determine the respective distances of different places; as well as that which separates two ships. It is very remarkable, that a weak sound propagates itself with the same velocity as one that is strong. The agitation of the air is, however, greater in proportion to the strength of the sound, because a larger volume of air is put into motion. Sound is therefore loud when many particles of air are in motion, and weak when it is confined to a few.

But what benefit could we derive from those observations which philosophers have made upon the nature and properties of sound, if our bodies were not so constituted as to enable us to receive the perception of sound? Let us then praise God, who has not only disposed the air in such a manner as to produce sound by its vibrations, but has also given us an organ capable of receiving every sonorous impression, from the deep and awful roar of the tempest which rages over the billowy bosom of the sea, to the gentle whisper of the breeze which refreshes without agitating the fair and delicate forms of vernal nature.

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A thin, elastic membrane, stretched at the bottom of the ear, like the parchment over a drum, receives the vibrations of air, and thus enables us to distinguish every species of sound. Thus far our knowledge of this subject extends; but if we enquire by what means, on the pronunciation of a word, our minds immediately form the idea of a word, and not of a simple sound, or why a tone can actuate our souls and create in them so many different notions, we are compelled to acknowledge our ignorance. Yet in this, as in every thing else, where our researches are shut in by the contracted limits of our finite nature, we ought to rest satisfied in the conviction of the wisdom and the goodness of our Creator. Had not sound existed, all mankind would have been mute, and alike inadequate to all the purposes of speech as the inarticulate babe which is yet insensible to the noble talent it will presently possess. By means of sound, every creature is able to make known its wants or express its happiness.

Man derives from this privilege advantages to which no other animal can aspire. He can at once express all the sentiments of his heart, and excite what passion he pleases by certain modulations of his voice. God has not only conferred upon us the power of distinguishing sounds by the organ of hearing, he has also furnished us with the means of preserving this precious faculty. When one ear has become injured, the other refuses not its services, but in some measure performs a double duty, and supplies the place of its suffering companion; as all our powers, whether mental or corporeal, improve by exercise, and quicken in their sensibility of the different objects to which they are applied, when the sense of hearing loses its wonted acuteness, the acoustic horn is often found to be of great benefit. Should it even happen that the external auditory tube be injured, the internal one, which terminates in the mouth, may probably have continued unhurt.

Another source of comfort in that wonderful chain of blessings which takes its origin from the simple faculty of sound, is the power of music. A multitude of harmonious instruments are formed to recreate and to charm us, and we listen with delight to their various tones, which we are enabled to discriminate with nicety and precision. Thus has our beneficent Creator condescended to minister even to our pleasures. With what grateful sentiments ought we then to approach his throne, inspired by the contemplation of those refined joys of which we are made susceptible through the influence of music. May the recollection of so elevated a privilege never cease to impress our minds with the fervour of pious thankfulness! May hymns of gratitude be resounded far as sound can traverse and air continue its vibrations! May the universe echo to his praise, and heaven and earth listen to the wonders which Omnipotence has performed for man!

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SEPTEMBER VIII.

THE MYSTERIES OF NATURE.

When men attempt to investigate things, and to penetrate into the causes of those effects which they have witnessed, they are compelled to acknowledge how weak and limited are their understandings. The knowledge we have of nature, of which we are sometimes so vain, extends little farther than to a superficial acquaintance with the effects of a few things which are immediately under our notice; and which we are able, in a certain degree, to apply to our own advantage. But to reach the causes of those effects, or to know how they operate, generally exceeds the grasp of our finite faculties. There are a thousand effects in nature which remain concealed from us: and in those which we are able to develop, a degree of obscurity almost always impedes our researches, and reminds us that we are but men. There are many phenomena of whose immediate causes we are ignorant; many others are doubtful; those which we do know are very few.

We hear the wind blow; we experience its powerful and various effects; but we know not exactly what produces it, what augments its violence, and what appeases it. From a small seed we see a plant spring with stalks and ears; and we know not by what means. Still less can we comprehend how a plant can spring from a small kernel and grow into a large tree, in the branches of which the birds make their nests; which covers itself with leaves, and with blossoms to refresh and to charm us, which gives us fruit for our nourishment, and wood for our various wants and conveniences. All the aliments which we use and which are of such different natures, are by an incomprehensible mechanism transformed within us into one substance; and this substance assimilates with our flesh and blood. We see the wonderful effects of the loadstone, and we believe that there must be a certain matter which operates in it; but whether it acts by an attractive power peculiar to itself, whether it is a sort of fluid perpetually circulating about the loadstone, or whether it forms a kind of vortex, we are unable to determine.

We feel the cold, but hitherto no naturalist has found out the cause of its production. We know more respecting the nature of thunder and lightning than our ancestors did; but to ascertain what that electric matter is which displays itself with such sublime terrors in the storm, eludes our feeble perceptions. We know that the eye recognizes the images which are painted on the retina, and that the ear is susceptible of the vibrations of the air; but how shall we discern what those perceptions are and how they are formed? We are conscious of the existence of the soul in the body; but who shall explain the nature of their union and of their reciprocal influences? The effects of fire and air are continually before us; but what is their precise nature, what are their integral parts, and

how do they produce their different effects? In a word, on the greater number of objects we have no sure and incontestable principles to satisfy our inquiries: they begin with conjectures, and they terminate, at best, in probabilities. What are the hypotheses of philosophers but so many tacit confessions of the confined limits of their knowledge? At every step nature presents us with wonders which confound and astonish us; and however deep our researches, however extensive our discoveries, still a thousand treasures of nature must ever remain covered with that mysterious veil, which cannot be drawn aside by the efforts of finite reason. It is true, we sometimes arrive at the power of giving happy explications to certain phenomena; but the principles, the first causes, their nature, and their manner of operation, are always elevated above the sphere of our intelligence.

The mysteries of nature every day impart to us lessons of wisdom on the subject of the mysteries of religion. In nature God has put immediately within our reach the means of passing happily our temporal life, although he may have hid their sources from us. Thus also in the kingdom of grace, he has furnished us with the powers necessary to the attainment of a spiritual and eternal life, whilst yet the manner of their operation remains concealed from us. Nobody refuses to eat and drink because he is unacquainted with the composition of the aliments which preserve his life and strength: neither does any one neglect to sow or plant because he has no just idea of the manner in which vegetation operates; nor shall we find any person so ridiculous as to reject the use of the wool which his sheep provide for him, merely because he knows not how it is produced. The extravagance of man rises not to this height. On the contrary, he is attentive to the productions of nature; experience shows him their utility, and he avails himself of it with gratitude to his Creator. But how shall we account for a conduct so opposite to this with regard to the mysteries of grace? Why are disputes entertained on the nature of the means of salvation, on their efficacy, and their mode of operation, whilst they neglect that salutary application of them for which they are designed? Why are we not as wise in spiritual things as in those which are temporal, and which 'perish with the using?' Instead of giving up ourselves to vain and idle speculations, let us be prevailed upon to lay hold of those gracious privileges which God has vouchsafed to us, and serve him with cheerfulness and fidelity. This is the purpose for which we are sent into a world replete with wonders, in a state of being which admits not of their solution, and not to trifle away our time in unprofitable researches and too curious disquisitions. If we meet with things which we cannot comprehend or penetrate, let us receive them with humility, and acknowledge in them the proofs of the feebleness of our understanding. It is sufficient that the advantage which accrues to us from the good use we make of them, convinces us that they are the work of a Being infinitely wise and beneficent.

God forbid that we should be so presumptuous as to indulge the hope of being able to fathom the mysteries of nature or of grace;

and let us be very careful not to censure what we cannot comprehend. Let us rather avow the weakness of our judgment, the blindness of our understanding, and, in the deepest prostration of soul, acknowledge the immensity of the Deity. Thus shall each mystery awaken adoration to that Being whose works are marvellous beyond human penetration, and whose wisdom infinitely transcends the brightest intelligence of man.

SEPTEMBER IX.

EYES OF ANIMALS.

The mere consideration of the eyes of different species of animals, is sufficient to convince us of the wisdom with which God has formed the bodies of his creatures. He has not given to all the organs of sight in the same manner, but has diversified them according to their different natures.

The eyes of most animals appear to be round; but even in this spherical figure there is considerable variety. Their situation in the head, near the brain, is subject to many variations. Man and the greatest part of quadrupeds have six muscles attached to each eye, by which they are enabled to move it from one side to another. The position of the eyes is such, that they can look straight forwards and almost describe a half circle. But in this there is some variety. Horses, oxen, sheep, swine, and most quadrupeds, have a seventh muscle to suspend and support the globe of the eye; and this is the more necessary because their head and eyes are inclined towards the earth, particularly when they feed.

The eyes of frogs differ from ours; for they can cover them with a transparent membrane, though of a close texture; this defends their eyes, and preserves them from the dangers to which animals in their particular way of life are exposed, living partly on land, and sometimes under water. Flies, gnats, and other similar insects, have a more perfect sight than other creatures; they have nearly as many eyes as there are apertures in their cornea; and whilst animals which have only two eyes are obliged to turn towards the objects they design to perceive by means of muscles; flies see very distinctly all round them without impediment, and without the necessity of moving their eyes, because one or other of these is continually directed towards the surrounding objects. Fish, which live in an element more dense than ours, could see nothing, and would be blinded by the strong refraction of the rays of light, though they have two well-formed eyes, if their crystalline humour was not spherical, by which they are enabled the better to collect the rays of light. They have no eyelids, and they cannot draw back their eyes; but their cornea, which is almost as hard as horn, preserves them from all danger. The mole was formerly supposed to be blind; but it is now discovered that it has ex-

tremely small black eyes, not larger than a pin's head. As this animal is almost always under ground, its eyes are defended from injury by being thus small, deep in the head, and covered with hair. The eyes of snails are placed at the extremities of their horns, which they can draw within their heads, or push out to discover distant objects. In some animals whose head and eyes are fixed and incapable of motion, this defect is compensated either by their superior number of eyes, or in some other way. The spider has four, six, and sometimes eight eyes, all placed in the front of a small round head without a neck; they are transparent and sparkling as diamonds. According to the mode of life and different necessities of certain species of spiders, their eyes are differently distributed in their head, that their sight may be extended to all sides, and that without moving their head they may discover the flies which they wish to ensnare. The chameleon, a species of lizard, has the singular property of moving one of its eyes whilst the other remains motionless; of turning one upward whilst the other looks down upon the ground; and of seeing at the same time both what is before it, and what behind. We observe the same faculty in some birds, and in hares and rabbits, whose eyes are convex; this peculiar property preserves them from many dangers, and enables them more easily to discover their food.

All these examples, and a much greater number might be given, evidently manifest the tender cares of Providence for the preservation of the most necessary organs. He has communicated the blessing of light to his creatures in different ways; and we are struck with admiration, when we consider the wonderful art displayed, and the precautions taken to preserve the possession of this precious organ, and to defend it from the dangers to which it is exposed. The situation of the eyes, their arrangement, number, and figure, in all animals could not have been differently disposed without the greatest inconvenience being felt. It is not merely for ornament and beauty, but for the benefit and advantage of the animals, that the Creator has made so much diversity in the structure and position of their eyes. Let the foregoing observations teach us to acknowledge and to celebrate the wisdom of God in all things; and seriously to consider the ends which he has proposed in the creation, that we may more and more magnify and exalt his power and goodness.

SEPTEMBER X.

FISH.

Unless we had seen fish, it would have been impossible to believe that such creatures existed. If a naturalist, who was only acquainted with land-animals, were told that a species of creatures inhabited water, so formed, that they could live, move, and propagate, and fulfil all the animal functions in that element, would he not treat such in-

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formation as unworthy of belief, and conclude from what happens to our own bodies when immersed in water, that it would be impossible for any animal to live and breathe long in a watery medium!

The way in which fish live, their structure, their motion, and propagation, are very curious, and afford fresh proofs of the wisdom and power of God. That animals may live in water it is necessary that their bodies be very differently constructed from those which live only upon land. And this peculiarity we find when we examine the exterior and interior structure of fish. Why have most fish a slender thin body, flattened on the sides, and pointed towards the head, but to enable them to swim, and more easily cut through the water? Why are they covered with scales, if not that their bodies may be defended from the pressure of the water? Why are many fish, particularly those which are destitute of scales, enveloped with a smooth oily covering, but to preserve them from injury, and to keep them warm? Their bones are peculiarly light and flexible; their eyes are deep in their head, and their crystalline humour is spherical, that they may be secured from injury, and more able to concentrate the rays of light. Their fins are their only limbs, and by them they perform their different motions. By means of their tail fin, they move forward; their back fin directs the motion of their bodies; their breast fin enables them to rise, and their belly fin preserves their balance. The gills are their organs of respiration; they are placed behind their head; and there are four of them on each side; of which the uppermost are the largest. They continually take in water by their mouth, which is their inspiration, and evacuate it through the gills, which is their expiration. The blood which proceeds from the heart, and which passes through the veins of the gills, does not return through the lungs to the heart, as in terrestrial animals, but is directly distributed to every part of the body. The organ most essential to fish in swimming is the air-bladder enclosed in their belly, and communicating with their stomach. By means of this bladder, they can make their body more or less heavy; when it is inflated they become lighter, rise, and can swim near the surface of the water; but when it is contracted, and the air is compressed, the body becomes heavier, and sinks in the water. If the bladder is pricked with a pin, the fish immediately falls to the bottom, and cannot again rise to the surface.

The immense number of fish, and their great variety of shape and size, also merit our attention. In the waters of Germany only there are more than four hundred different species of fish; and how numerous must be the individuals of each species! Their figure also is much varied. We see among fish the greatest as well as the smallest animals. Some are long and fine as a thread; others short and broad; others are flat, round, triangular, &c. and some are armed with a horn; others with a species of sword; and others with a kind of saw. Some have nostrils through which they evacuate the superfluous water they have swallowed. We have in all this abundant cause to admire the power and wisdom of the Creator, so eminently displayed

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in the formation of these animals, and to be grateful for his goodness in giving them all for our use.

SEPTEMBER XI.

OF THE PROPAGATION OF ANIMALS.

It was once supposed that vermin, insects, and even some quadrupeds, were generated from putrefaction, without the interposition of other animals of the same species; but this opinion, so contrary to reason, is refuted by the most incontestable experiments. It is now generally understood that all animals are capable of producing others, and that this propagation is generally effected in two ways; by eggs, and by producing the young ones alive. All animals that give milk, or of the class of mammalia, are viviparous. All birds are oviparous; but their eggs, before they are capable of producing young creatures, must be impregnated by the male. In most animals it is necessary for the male and female to unite together; fish only seem to be an exception to this rule. They have not been known to couple, but the male is supposed to impregnate the eggs after they have been spawned.

Fish are the most prolific of all animals; their multiplication is astonishingly great. It has been ascertained that the pike lays three hundred thousand eggs, the carp above two hundred thousand, and the mackerel near half a million. The eel is viviparous. Most amphibious animals propagate their species like others, except that some of them resemble fish in this particular. Some are viviparous, and others oviparous; the latter however do not hatch their eggs, but leave them to the warmth of the air, or water; and others deposite them in dunghills.

Worms are both viviparous and oviparous; most of them, if not all, are hermaphrodites, partaking of the nature of both sexes, with the power of self impregnation. The distinction of sexes is very evident in most insects; though in some no sex can be observed, and others seem to combine both sexes in one body. Insects are generally oviparous; though some are viviparous. The eggs of the former are hatched by the warmth of the air. The insect called the leaf-louse, or blight, is viviparous; an insect of this species taken at the time of its birth, separated from all intercourse with insects of the same species, and shut up perfectly alone, will nevertheless produce young ones. This takes place in the following manner: In spring, and during summer, the females of this class of insects bring forth their young without previous union with the male; they are then viviparous. A single one will produce a hundred more in less than than three weeks. All that are born in this season are females: the males are produced in autumn; at which time they couple, and the females lay eggs, which are hatched in spring. Thus one junction of the male and female

produces several generations, the individuals of which are impregnated in their mother's eggs also.

When we reflect on this variety in the propagation of animals, we must be convinced of the power and wisdom manifested in an extraordinary degree. The instinct which leads the two sexes to unite together is truly admirable, and is a natural propensity, not produced by any external or adventitious circumstances. Most animals have a precise time for bringing forth their young, and every thing that is known with respect to this part of the animal economy displays an equal wisdom with the rest of nature's works; and we have great reason to be thankful that the different species of animals are preserved by means of that instinct, which induces them at certain periods to unite together for the preservation and continuance of their race.

SEPTEMBER XII.

INFLUENCE OF THE MOON UPON THE HUMAN BODY.

Formerly certain influences were ascribed to the moon, tending to nourish superstition and occasion idle fears. The gardener would not plant till he had made observations on the moon, and the husbandman would not sow till he was assured of the happy influence of this planet. Those who were sick paid a strict attention to the variations of the moon, and even physicians regarded their influence as an object worthy of notice. As knowledge became more generally diffused, these prejudices began to disappear; and the influence of the moon is no longer considered so powerful and universal an agent in nature as was formerly imagined. The present age is less superstitious than the last; and it is the duty of every man to use all his exertions in separating truth from error, and to rescue his fellow-creatures from the despotic sway of blind superstition. With regard to the effects of the moon on the human body, some caution is requisite before we pronounce a decided opinion upon it; for totally to deny such an influence would be as irrational as to attribute to it a very great power and action. We must allow that the moon produces great changes in the air, and hence may occasion certain alterations in our bodies. The moon may cause, in the superior part of the atmosphere, such considerable motions and alterations, as to produce winds, heat, cold, exhalations, mists, &c. by which the health of our bodies may be greatly affected. It is observed that people labouring under certain infirmities experience exacerbations, and more acute pains, at the new and full moon. And if it is true that a cold moist air, and foggy stormy weather, have very different effects upon the body than a warm, dry, and serene air, it is by no means surprising that the moon has an influence upon our constitution, seeing that it so considerably affects the state of the air. The action then of this planet upon the

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human body cannot be disputed, because it is founded on a certain principle, which is, that our health greatly depends upon the weather, and the constitution of the air we breathe, and these are materially affected by the moon.

In general we ought to admit it as a principle, to the glory of our Creator, that in all natural things there are certain connexions which influence the animal economy in various ways. There are doubtless in the atmosphere many wonders unknown to us, and which may occasion considerable revolutions in nature; and there may certainly occur many phenomena in the corporeal world which are influenced by the moon. The light reflected from her during the night is probably one of the least of the purposes she answers; and her being placed so near to the earth was perhaps to produce certain effects upon it, which the other planets could not do, because of their greater distance; for we have reason to believe, that every thing in our system has some relation to our globe. The beauty of the universe consists in the diversity and harmony of the several parts which compose it; in the nature of their effects, and in the total of happiness which results from the various combinations. If then we believe that God has arranged all, and established the connexions which exist among the spheres, we shall banish from our minds every superstitious fear of the influence of the moon and planets, and shall no longer suffer vain terrors to pervade our hearts; but we shall be convinced such ideas are contrary to divine wisdom; and as we become persuaded that he who governs all things with infinite goodness and power, operates only for the happiness of his creatures, we shall confide in him with certainty, and repose upon his parental regard with joyful and heart-felt gladness.

SEPTEMBER XIII.

THE MINERAL KINGDOM.

We require many materials to enable us to procure wholesome and convenient dwellings. If these materials had been scattered over the face of the earth, considerable inconvenience would have been experienced, and plants and animals would scarcely have had sufficient room. But happily our earth is free from such encumbrance. Its surface may be traversed by its inhabitants, or cultivated without any hinderance. Metals, stones, and several other substances which we continually use, are enclosed beneath our feet in immense receptacles, whence we extract them when we want them. These bodies are not concealed in the centre of the earth, nor are placed at an inaccessible depth; they lie beneath the surface, which covers them as a dome, and which, whilst it is sufficiently thick to produce nourishment for man, is thin enough to be readily dug through; so that we can obtain the substances contained in these vast storehouses of nature.

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All the substances in the mineral kingdom may be divided into four classes, each having its distinguishing characteristic. The first class includes the earths. This name is given to such bodies as are not dissolved by water, fire, nor oil, which are not malleable, and bear the action of fire without losing any of their substance. This class, besides the simple earths, includes the stones which are composed of them. Of stones, there are two kinds, precious and common; the latter are the most numerous, and present us with masses differing in figure, colour, size, and hardness, according to their component parts. There is also a considerable diversity among precious stones. Some are perfectly transparent, and these appear to be the most simple; others are more or less opaque, according to their particular composition.

Salts form the second class in the mineral kingdom. They are divided into acids, which are sharp and sour; and into alkalies, which impart to the tongue a bitter, burning, and lixivial sensation; these have the property of changing vegetable blues into green, whilst the acids convert blue into red. A certain combination and mixture of these two different salts, form what are called neutral salts. Among these is classed common or kitchen salt, which is extracted from the earth, or prepared from sea-water by evaporation. All these salts are one of the principal causes of vegetation. They also probably serve to unite and strengthen the parts of plants, as well as of other compound bodies; and they produce fermentation, the effects of which are so various.

The third class of the mineral kingdom comprehends those inflammable bodies, which are generally called bitumens. These burn in the fire, and when they are pure dissolve in oil, but never in water. They differ from other minerals, by containing more of inflammable matter, which renders those bodies in which it is found in a sufficient quantity combustible; and there is more or less of it in all bodies.

The fourth class contains the metals. These are the heaviest of all bodies; they become fluid if exposed to the action of a strong heat, and resume their solidity when cooled. They are resplendent and malleable. Some of them when melted in fire experience no diminution of weight, nor any sensible alteration; and these are called the perfect metals; of which there are three species, gold, silver, and platina. The imperfect metals are destroyed more or less readily by the action of the fire, and are converted into oxides. One of these, lead, has the property of being converted into glass, and of vitrifying all other metals, except gold and silver. The imperfect metals are five in number, viz. mercury or quicksilver, lead, copper, iron, and tin. There are besides other metals distinguished from these in being neither ductile nor malleable; these are called semi-metals, and are seven in number, platinum, bismuth, nickel, arsenic, antimony, zinc, cobalt.*

* The division of metals into perfect and imperfect, into metals and semi-metals, is now generally discarded. Since the author wrote the above, more metallic substances

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The whole mineral kingdom may be regarded as the workshop of nature, where she secretly labours for the benefit of the creation; but we are ignorant of the way in which she operates, and we cannot discover how she forms the various substances which she presents to us. We are not well acquainted with the surface of the earth, much less do we know the interior. The deepest mines are not more than six hundred and thirty fathoms below the surface, and that is not the six thousandth part of the earth's diameter. This alone is sufficient to convince us of the impossibility of having an exact knowledge of the nature and formation of the various substances in the mineral kingdom. But fortunately, in the use which we make of the gifts of nature, it is of little consequence whether or not we are exactly acquainted with their origin and first principles. It is sufficient for us to know how to apply them to the most beneficial purposes; and we know enough of them to be convinced of the glory of the Creator, whose power, wisdom, and goodness, are manifest in every thing above or beneath the earth.

SEPTEMBER XIV.

EXOTIC PLANTS.

Men never regard with sufficient attention the gifts of God, particularly those which come to us from distant countries. If we considered how much labour and industry are required before we can obtain a little sugar, or cinnamon, we should not receive the gifts of nature with such unconcern as we generally do; but we should look up with gratitude to that Supreme Being who makes his blessings flow to us through so many channels. At present let us consider those foreign productions which have become so necessary to us, and without which we should feel much inconvenience. From such a consideration useful reflections may arise, and we shall probably regard with more pity our unfortunate brethren who are condemned to slavery, and whose severe labours procure us so many luxuries.

Sugar is found in a certain reed which is principally cultivated in Brazil and the neighbouring islands; and it also abounds in the East Indies, and some of the African islands. The preparation of sugar

have been discovered, and for the reader's information I have inserted, from Thompson's Chemistry, the following more complete arrangement.

I. *Malleable.*	II. *Brittle and easily fused.*	III. *Brittle and difficultly fused.*
1 Gold	1 Bismuth	1 Cobalt
2 Platinum	2 Antimony	2 Manganese
3 Silver	3 Tellurium	3 Tungsten
4 Mercury	4 Arsenic	4 Molybdenum
5 Copper		5 Uranium
6 Iron		6 Titanium
7 Tin		7 Chromium
8 Lead		
9 Nickel		
10 Zinc		

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does not require much art; but it is very laborious, and is chiefly performed by slaves. When the canes are ripe, they are cut down, and carried to the mill to be bruised, that the juice may be extracted from them. This juice is first boiled, by which means it is prevented from growing sour and fermenting. When it boils they skim it, take off all impurities; and this boiling is repeated four times in four different vessels. Still further to clarify and purify it, they throw into it a strong lye of wood-ashes and quick-lime; and lastly, they cast it into moulds, that it may coagulate and dry.

Tea is the leaf of a shrub which grows in Japan, China, and other parts of Asia. These leaves are gathered two or three times during the spring. Those of the first gathering are the finest and most delicate, and constitute what they call imperial tea; but it never comes to Europe, that which the Dutch sell under that name is only the second gathering.

Coffee is the kernel of a fruit resembling a cherry. The tree which bears it is a native of Arabia, but it has been transplanted into many warm countries. Next to Arabia it flourishes best in the island of Martinique. The kernel which is found in the middle of the fruit is called a berry; when fresh it is yellowish, gray, or pale green, and it preserves this colour when it is dry. The fruit is spread on mats for the purpose of being dried in the sun; it is then bruised with rollers, that the fruit may be separated from the kernel; and hence it is that each berry is divided into two halves. The kernel is dried a second time before they are shipped.

Cloves are the buds or dried blossoms of a tree which formerly grew without culture in the Molucca islands; but the Dutch have since transplanted it to Amboyna. The tree itself resembles the laurel in size and form; its trunk is covered with bark like the olive-tree. White flowers grow from the extremity of the branches. At first the buds are of a pale green, they then become yellow, afterwards red, and at length of a dark brown, such as we see them. They have a more penetrating aromatic odour than the mother clove, which is the dry fruit of the same tree.

Cinnamon is the second or inner bark of a species of laurel or bay-tree which grows chiefly in the island of Ceylon. The root of the cinnamon tree is divided into several branches, and is covered externally with a grayish bark; but the inner bark is red. The leaf would resemble that of the laurel, if it was shorter and less pointed. The flowers are small and white, with an agreeable fragrance like that of the lily. When the tree has attained some years growth, the bark is stripped off, and the outer bark being good for nothing is thrown away; the inner bark is dried in the sun and rolled up in sticks, and is then what we call cinnamon.

Nutmegs and mace are the produce of a tree which grows in the Molucca islands. The nut is covered with three rinds; the first of which falls off when the nut is ripe; and then the second, which is very thin and fine, appears; this is detached with much precaution from the fresh nut, and exposed to the sun to dry. In the Molucca

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islands it is called mace, and here it is erroneously termed the nutmeg blossom. The third bark immediately covers the nutmeg itself, which is taken out of its shell and put into lime-water, where it remains for some days, and is then sufficiently prepared for exportation.

Cotton grows in most parts of Asia, Africa, and America. It is the fruit of a kind of pod, which, when ripe, opens and presents a flock of extremely white down, and this is called cotton. When the pod is swelled by the heat it becomes as large as an apple. By means of a little mill they make the seed fall on one side, and the cotton on the other. It is afterward spun for different works.

Olive oil is the expressed juice of the fruit of the olive-tree, which is very abundant in France, Spain, Portugal, and Italy. The inhabitants of the countries where these trees abound make use of the oil instead of butter, because the grass being withered by the heat, they are not able to keep many cows.

Pepper is the fruit of a shrub whose stalk requires a prop to support it. The wood is knotty like the vine, to which it bears a near resemblance. The leaves, which have a powerful smell, are oval, and terminate in a point. In the middle, and at the extremity of the branches, are white flowers, whence the fruit grows in bunches, each fruit bearing from twenty to thirty peppercorns.

It is highly pleasing to reflect upon the great variety of aliments designed to afford us pleasure, as well as support. The grateful mind loves to consider those blessings which the divine bounty has so abundantly bestowed upon us. Every country contributes to our necessities and comfort: the most distant climates yield us their rich stores, and whilst we enjoy them at our ease, let us not forget those suffering and hard-labouring people, who have been torn from their homes, and seen their dearest ties snapped asunder, to drag out a miserable existence in providing for the luxuries of men, who call themselves Christians

SEPTEMBER XV.

THE STRENGTH OF MAN COMPARED WITH THAT OF ANIMALS.

Though the human body appears to be more delicate than that of most animals, it is yet much stronger in proportion to its size than that of the most vigorous animals. A man's strength is best estimated by the weight he is able to carry. If it was possible to unite a single point, or in a single effort, all the strength that a man exerts in a day, it would be found that the weight he could lift every day a foot from the ground, without injuring himself, would be equal to one million seven hundred and twenty-eight thousand pounds. Men accustomed to hard labour can generally carry a burden of one hundred and fifty or two hundred pounds weight, without much exertion; and

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common porters often carry loads from seven to eight hundred pounds weight. The size of a man's body in proportion to that of a horse is as one is to six or seven; if then the strength of the horse was proportioned to that of a man, he ought to be able to carry a load of twelve or fourteen thousand pounds weight. But no horse can carry so much; and allowing for the difference of size, his strength is only equal, if not less than that of a man. A French experimentalist has ascertained the strength of the human body, by having a sort of harness made, by means of which he placed on every point of a man's body, standing upright, a certain number of weights, in such a manner, that each part of the body supported as much as it could bear relatively to the rest, each having its proper proportion of the load. By means of this machine, a man supported a weight of two thousand pounds, without being at all overloaded.

We may also judge of a man's strength by the continuance of his exercise, and the agility of his motions. Men accustomed to hunting will outrun horses, and can continue the chase longer: and even in a more moderate exercise, a man accustomed to walking will travel each day farther than a horse can. At Ispahan, couriers go nearly thirty leagues in ten or twelve hours. Travellers inform us that the Hottentots overtake lions in the chase, and that the American Indians pursue the elk with such rapidity that they tire it and then seize it, though this animal is as swift as the stag. Many other remarkable things are related of the fleetness of the Indians, of the long journeys that they perform on foot, over the most rugged mountains, and through countries where there is no track or road. It is reported that these men perform journeys of a thousand or twelve hundred leagues in less than six weeks or two months. What other creature, except birds, can undertake such long journeys? Man in a state of civilization does not know how much strength he possesses; how much he loses by effeminacy, nor how much he can acquire by frequent exercise. Sometimes we find men of a very extraordinary strength; but this gift of nature, which would be so valuable if they were obliged to employ it in self-defence, or in useful labour, is of little advantage in a civilized state, where the powers of the mind are of much more avail than bodily strength, and where manual labour devolves on the lowest classes of society.

Here again we may acknowledge the admirable wisdom with which God has formed our body, and rendered it capable of so much activity. We cannot but regard with pity those indolent beings who pass their lives in idleness and effeminacy; who never exert their strength, nor exercise their powers, for fear of injuring their health, or shortening their lives. Why has the Almighty blessed us with strength, unless that we may employ it to some useful purpose? When, therefore, we dissipate it in indolence and inactivity, we oppose the will of our Creator, and become guilty of the basest ingratitude. Let us, in future, exert all our power and apply our several faculties for the good of our fellow-creatures, according to our situation and circumstances; and, if necessity requires, let us cheerfully earn our bread by the sweat of

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our brow; even then our happiness is greater than that of thousands of our fellow-men, who groan beneath the insufferable yoke of slavery, and who, when worn out with labour and fatigue, and their strength is exhausted, have no means of procuring ease and comfort for their oppressed bodies, nor soothing voice of kindness to cheer the sad moments of sickness, or encourage their drooping soul; hope is denied them, and their only consolation is the silence of the grave. The more happy we find our lot, compared with these unfortunate victims of luxury, the more seriously ought we to apply ourselves to fulfil our duties; and the success of our labours should induce us to love and to praise God, who has vouchsafed to grant us strength and ability, and graciously continue to preserve them.

SEPTEMBER XVI.

INSTINCT OF THE BUTTERFLY IN THE PROPAGATION OF ITS SPECIES.

This is the season of the year when butterflies begin to disappear from the creation; but the race is not extinct; they live again in their posterity, and by a wonderful instinct they provide for the preservation of their species. From the eggs which they lay, new generations arise; but where do they place them at the approach of the rigorous season, and how do they defend them from the autumnal rains, and the penetrating frost of winter? Are they not in danger of being frozen or drowned?

That beneficent Being, who gives wisdom to man, has also condescended to instruct the butterfly how to secure the only legacy it can bequeath to the world, by covering its eggs with a glutinous substance which is secreted by its own body. This sort of glue is so tenacious, that rain cannot penetrate through it, and the ordinary cold of winter cannot destroy the young ones contained in the eggs. It is worthy of remark that though each species always follows the same method from generation to generation, there is still much diversity in the means which different species take for the preservation of their race. Naturalists have informed us, that some of these insects lay their eggs at the beginning of autumn, and die soon after, whilst covering their tender young. The sun warms their eggs, and before winter a number of little caterpillars are hatched; these immediately begin to spin, and with their thread make themselves nests and very commodious lodgings, where they pass the cold season, without eating, and nearly without motion. It is also remarkable that the butterfly, like other insects, only lays its eggs upon those plants which agree the best with its young, and where they may find the necessary nourishment: so that as soon as they are hatched they are surrounded by the aliment which is most proper for them, without being obliged to remove at a time when they are too feeble to undertake long journeys.

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All these and many more circumstances of a similar nature, are calculated to make us admire the wise arrangements of an all-preserving Providence. If we do not require miracles, and things contrary to the usual course of nature, to affect and render us attentive, the consideration of the cares which these insects have for their offspring, so diverse in different species, but always uniform and constant in each individual, would fill us with the greatest admiration.

Let us, who are rational beings, learn from these insects to cherish in our hearts a love for our children, and to interest ourselves for the benefit of those who are to succeed us on the stage of life. Let not the fear that death may surprise us in the midst of our labours divert us from forming great projects, or undertaking noble enterprises; remembering that in thus devoting ourselves to the public good, we only repay to posterity the debt we owe to our ancestors. If parents of children were to imitate the female butterfly, which provides for the little ones which survive her, they would never leave their helpless children in want, but would place them in such a situation, that when the parents cease to live, their children should have no other cause of sorrow than the loss of a kind father, or of a tender mother. Though we cannot foresee, much less prevent, those misfortunes and contingencies to which they are liable, we ought certainly to take care that their future condition in life is not unhappy by our neglect. Would to God that all parents were concerned as becomes them for the future welfare of their offspring; that they would not leave their families in disorder and confusion; and that they would do well to regulate their domestic affairs, and that after their death their unprotected children might not be exposed to vexatious embarrassments, nor witness their inheritances enjoyed by strangers, and their property consumed by law-suits!

SEPTEMBER XVII.

THE VINE.

To be convinced how unreasonable and absurd it is to complain of the inequalities of the earth, we need only consider the nature of vines. The vine never succeeds well in a flat country, neither does it thrive on every hill; but only on those which have a south or east aspect. The highest hills, and steeps where the plough never reaches, are yearly covered with verdure, and produce the most delicious fruits. If the soil which nourishes the vine appears poor and destitute, the vine-producing plant appears equally unpromising. Indeed had we not known it by experience, we could scarcely have believed that a seemingly dry and mean wood should produce such a delicious liquor. The evaporation from the vine is so considerable, that one hundred and fifty-two inches of sap are required to rise in the space of twelve hours, to supply the fluid which exhales through the leaves.

Much wisdom is displayed in the distribution of vineyards over the

earth. They do not succeed alike in all places; to thrive well they should be situated between the fortieth and fiftieth degrees of latitude, consequently about the middle of the globe. Asia is properly the country of the vine, whence its cultivation has been gradually introduced into Europe. The Phœnicians, who at a very early period traversed the coasts of the Mediterranean, brought it to the continent and most of the islands. It succeeded remarkably well in the isles of the Archipelago, and was at length brought to Italy, where it multiplied considerably; and the Gauls, who had tasted of the grape juice, wishing to establish themselves in the country where it was produced, passed the Alps, and made themselves masters of both banks of the Po. The vine was soon afterward cultivated throughout France, and flourished upon the banks of the Rhine, the Moselle, the Necker, and in different provinces of the German empire.

The consideration of the vine may give rise to some very important reflections. As the most barren soils are good for the cultivation of the vine, so it sometimes happens that the poorest countries are favourable to science and wisdom. In provinces universally despised for their poverty, men have arisen, the rays of whose genius have beamed upon distant countries. There is no place so desert, no town so small, or village so miserable, as entirely to preclude the successful cultivation of science: all that is required for its increase is encouragement. What an inestimable blessing then we have in our power to procure, if we only will give ourselves the trouble of cherishing the virtues of the human heart, and improving those mental powers which we possess for the noblest purposes! Sovereigns, pastors, and teachers of youth, how essentially might you contribute to the happiness of your fellow-creatures, and of your remotest posterity, if, by proper exhortations, rewards, useful establishments, and adequate encouragements, you endeavoured to restore religion, science, and all the social virtues, into ruined cities, and desolate villages! Efforts like these can never be entirely useless. If we ourselves do not receive the recompense of our labours in seeing them attended with present success, our descendants will at least receive the fruit of them, and we shall be ranked among those excellent characters, who, by being the benefactors of the human race, have obtained the approbation of God and the benediction of their fellow-creatures.

The vine, with its dry and shapeless wood, is emblematical of those men, who, destitute of the honours of birth, and the splendour of rank, still do much good. How often it happens that men born and living in obscurity, whose external appearance promises little, perform actions, and undertake enterprises, which raise them above all the princes of the earth! And here we may reflect with advantage upon Jesus Christ himself; to judge of whom from the mean and abject state in which he appeared when personally on earth, we should not have expected those great and wonderful works which have made him the Saviour of mankind. He has shown us that we may be poor, despised, and miserable in this world, and yet successfully labour for the glory of God, and the good of our fellow-creatures.

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SEPTEMBER XVIII.

HYMN TO CELEBRATE THE WORKS OF THE CREATION.

Praise ye the Lord! Let all tongues and people celebrate him with songs of joy! Sing aloud, and exalt his power and goodness! Adore him, ye nations; prostrate yourselves before him, ye islands! Praise and glorify the supreme Ruler of the universe!

It is he whose power drew forth out of nothing the elements, the heavens, and light itself: it is he who separated the earth from the bosom of the waters; and his almighty hand formed the sea, and all the innumerable host of creatures which live upon his bounty.

It is he who has given light and heat to the sun; who has prescribed laws to the moon; who has marked out to the stars their course; and who flashes in the lightning, and speaks in the thunder! It is he who bids the tempest roar; and the strength of the lion, and delicate structure of the insect, are monuments of his power. To gladden the hearts of men, he has taught the nightingale to warble her melodious strains; he gives to the flowers their fragrance; he balances and puts in motion the air; he calls forth the winds and directs their course. The sea at his powerful word swells in billows, and again subsides at his command; for God reigns in the bosom of the deep. Let us then bow down before and adore the Supreme Being, whose grandeur is manifest in all his creatures, and the traces of whose infinite power the whole creation declares.

SEPTEMBER XIX.

WONDERS WHICH GOD DAILY EFFECTS IN THE CREATION.

The whole universe, which continually preserves that beauty and order in which it was first established, is a miracle constantly before us. How astonishing is the world which we inhabit! How immense is the number, grandeur, variety, and beauty, of the creatures which it contains! What other arm than that of the omnipotent God could have placed in the immense expanse of the heavens the sun and all those stars, whose prodigious size and distance fill our minds with astonishment? Who but God has prescribed to them the spheres in which they have revolved for thousands of years? Who else has determined with such skill the respective power of all these globes; and established a perfect balance between them and the ether in which they are suspended? Who has placed the earth at such a just distance from the sun, that the space between them is neither too great nor too small?

The alternation of day and night; the revolutions of the seasons; the innumerable multitude of animals, of reptiles, of trees, of plants,

and of all the different productions of the earth, are the works of the Almighty God. His particular and especial providence is a continual proof of his greatness, wisdom, and omnipresence. His constant cares for us, and that marked protection, instances of which almost every person has met with; the various means he employs to attract men to his service; the ways by which he leads them to happiness; the misfortunes which he tries them with, to awaken them and bring them to a sense of their situation; the extraordinary events which he orders for the good of his empire; events which are commonly produced by slight causes, and in circumstances which seem to render them impossible; the great revolutions which he effects, to make his holy truth and the knowledge of himself pass from one country of the earth to another; are all so many effects, in which we ought to acknowledge his constantly acting power, and which, if we were sufficiently attentive, would make us say with the Psalmist, 'This is the Lord's doing; and it is marvellous in our eyes.'

Let us be attentive to what passes before us, and we shall every where discover the traces of a God; we shall see that by the ordinary means of his grace, he continually works for our sanctification; that his divine word continually dwells among us, and that his saving voice may be continually heard. Surely those who refuse to listen unto him, who resist the impulse of his Holy Spirit, and who do not yield to his merciful visitations, would not be converted though new miracles were wrought in their sight. Ought not man, who sees that God has created the world, which every where presents to him so many wonders; man who is constantly receiving the blessings of heaven, and who owes to God all the advantages which he enjoys, ought he not to believe, to love, and to obey him? Yet he resists. What then can affect him, or whom will he not oppose?

Let us then, who daily witness the wonders of our God, pay attention to them, and no longer harden our hearts against truth. Let not prejudice or passion prevent us from reflecting upon the admirable works of God. Let us contemplate the visible world, and reflect upon ourselves, and we shall find sufficient cause to acknowledge him who daily works miracles before us; our souls possessed with these grand ideas, we shall cry out with rapture and admiration, 'Praise, honour, and glory be ascribed unto God, the author of all good and the redeemer of our souls; who alone performeth wonders, and who visiteth the heart of man with comfort and sweet consolation; who poureth balm into our wounds, supports us in affliction, and wipes the tear from every eye; unto that God of all mercy be rendered love, gratitude, and adoration for ever and ever, through the countless ages of eternity

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SEPTEMBER XX.

DIGESTION OF FOOD.

Digestion is an admirable and complicated process, which we daily perform without knowing how, and even without giving ourselves the trouble of learning what is most remarkable and essential in a function so important to the human body. It is well for us that digestion may be carried on, though we are ignorant how it is performed; but it is always preferable to be acquainted with the process, and to have some knowledge of the operations of nature in this respect.

When the food has been sufficiently masticated, and divided by the teeth into small portions, and moistened by the saliva, it is prepared to pass into the throat. This is the last function relative to digestion, in which the will assists; all the rest is done without our being conscious of it, and without our being able to prevent the process going forward. As soon as a portion of food enters the throat, it pushes the mass onward, and causes it to descend into the stomach by a peculiar mechanism, for the gravity of the food alone would not be sufficient. Having entered the stomach, the food is there reduced into a soft paste of a gray colour, which, after being sufficiently attenuated, passes into the duodenum, or first intestine, where it undergoes new changes. Several small vessels which proceed from the gall-bladder, and from a gland situated behind the bottom of the stomach, and called the pancreas, open into the duodenum, and pour into it the bile and the pancreatic juice, which mingle with the food. There are also in the intestines a great number of glands, which distribute their humours through every part of the alimentary mass. It is after this mixture, that true chyle is discovered, and there is great reason to believe that it is in the duodenum that digestion is completed.

The alimentary mass continues its course through the other intestines, where it is continually moistened by the fluids which are secreted in the intestinal canal. The chyle then begins to pass into the lacteal veins, which every where open into the intestines, and terminate in a vessel called the receptacle of the chyle, which is situated near that part of the back where the first lumbar vertebra begins, and from it the thoracic duct rises, and ascends upwards through the chest, passing along by the side of the spine, and opens into the left subclavian vein near the internal jugular. The chyle then passes through this canal, and at length mixes with the blood, enters the heart, and having lost its white appearance, is distributed through all the arteries of the body.

But there are always some parts of our aliment that are too gross to be converted into chyle, or to enter into the lacteal vessels. These are propelled downwards by a motion peculiar to the intestines, called the peristaltic or vermicular motion, by means of which they are alternately contracted and dilated. When this motion has caused the mass of food to advance as far as the third intestine, it propels the

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remainder through the fourth, fifth, and sixth; which last is called the rectum, and is provided with a strong, circular muscle, the sphincter, which contracts, and prevents the residuum continually passing through the rectum; thus retarded, it remains till the quantity is so considerable as to occasion irritation, and is then finally evacuated. In this operation the muscles of the abdomen and the diaphragm assisting the action of the rectum, the contracting power of the sphincter is overcome. From the above slight sketch of the manner in which digestion is performed, we may obtain some idea of the great wisdom which God has displayed in a function so essential and important to our health, our comfort, and our very existence; we should be highly culpable indeed if we were inattentive to it; and if these wonders excited in our hearts no gratitude towards the author of so many blessings which we are continually enjoying.

SEPTEMBER XXI.

THE PREVALENCE OF GOOD IN THE WORLD GREATER THAN THAT OF EVIL.

Nothing is more consoling in our trials and misfortunes than to admit, as a fixed principle, that there is more good than evil in the world. If we ask the most wretched of men whether he can enumerate as many causes of complaint as he has motives for gratitude, he will make it appear that, however great are his afflictions, they do not equal the numerous blessings he has received in the course of his life. To render this truth more evident, let us calculate how many days we have passed in the enjoyment of health, and how few in which we have suffered from illness. Let us oppose to the small number of troubles and vexations which we experience in civil and domestic life, the numerous pleasures which we enjoy. Let us compare all the good and virtuous actions by which men are useful to themselves and to their fellow-creatures, with the few actions they commit that are prejudicial to society. Let us enumerate, if we can, all the pleasures attached to every age, state, and profession; the gifts which nature abundantly bestows upon us, and which human industry uses to procure an infinite number of enjoyments and conveniences. Let us reckon all the delight we receive upon escaping a sudden danger, upon gaining a victory over ourselves, and upon performing some act of virtue or wisdom; and let us remember that it is the prevalence of good that renders us so sensible of evil; that recent prosperity makes us forget former blessings; and that if our misfortunes make so deep an impression upon our memory, it is because they seldom happen, and we are not familiar with them. In this calculation, we must only oppose to the blessings, the fruition of which we recollect, those evils whose utility we do not yet know; for out of some evils great good is derived: if then we make this estimation in the moments of coolness

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and of serenity, and not at a time when we suffer from affliction, vexation, disappointment, or disease, we shall be sufficiently convinced, that the prevalence of good, even in this state of existence, is much greater than that of evil.

Why then do men concern themselves so little with the continual proofs they receive of God's goodness? Why do they love to dwell upon the dark side of things, and to torment themselves with unnecessary cares and anxieties? Has not divine Providence surrounded us with pleasing objects? Why then do we for ever brood over our infirmities, our wants, and the evils which may happen to us? Why magnify them in our imagination, and obstinately turn our eyes from all that tends to cheer and tranquillize our hearts? But such is our disposition, the least misfortune that befalls us arrests all our attention, whilst a long continuance of happy days passes unnoticed. We draw upon us distress and vexation, which could not have happened if we were more attentive to the blessings of God. Let us then in future abandon a disposition like this, which only renders us miserable; let us feel a strong conviction that God has impartially distributed his blessings over the earth, and that there is no man who has just cause to complain, or who has not on the contrary the most powerful and abundant reasons to express his gratitude in songs of joy, thanksgiving, and praise.

Blessed be God, who is our sovereign good! He pours joy and gladness into our hearts: if he sometimes tries his children with affliction, his consolations soon visit their desponding souls; and his goodness promises them an uninterrupted, endless felicity. He leads us through secret and unknown paths to the infinite blessings he designs for us; the very trials which he sometimes sends have a beneficent purpose to accomplish, and which we shall one day know and acknowledge; till when he spares us from suffering more than we can bear, and his all-powerful and paternal hand still protects us, and the eye of his mercy watches over us for our good and eternal preservation.

SEPTEMBER XXII.

ENMITY BETWEEN ANIMALS.

There is a continual enmity among animals; they are constantly attacking and pursuing each other: every element is a field of battle for them; the eagle is the terror of the inhabitants of the air; the tiger lives upon the earth by carnage; the pike in the waters; and the mole under ground. It is the want of food which induces these, and many other species of animals, to destroy one another. But there are some creatures whose hatred of each other does not proceed from the same source. Thus those animals which entwine themselves round the elephant's trunk, and press it till they have suffocated

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him, do not act so with the design of procuring nourishment. When the ermine leaps upon, and lays hold of, the ear of the bear and the elk, and bites them with his sharp teeth, we cannot affirm that this is done to satisfy the calls of hunger.

There is scarcely any creature, however small, which does not serve for food to some other animal. I know that many people think this arrangement of nature is cruel and unnecessary; but I can with confidence assert, that even this antipathy and enmity among animals, is a proof that every thing is wisely ordered. If we consider animals in the whole, we shall find that it is highly useful that some should subsist upon others; for on the one hand, without this arrangement many species could not exist; and on the other, these numerous species, instead of being prejudicial, are extremely useful. Insects and many reptiles feed on carrion; others establish themselves in the bodies of certain animals, and live upon their flesh and blood; and these insects themselves serve as food for other creatures. Carnivorous animals and birds of prey kill and feed upon other animals. Some species multiply so abundantly, that they would become burdensome if their numbers were not diminished. If there were no sparrows to destroy insects, what would become of the flowers and fruits? Without the ichneumon, which seeks out and destroys the crocodile's eggs, this terrible animal would increase to an alarming degree. A great portion of the earth would be desert, and many creatures would not exist, if there were no carnivorous animals. It will perhaps be urged that they might live upon vegetables; but if this were the case, our fields would scarcely afford subsistence for sparrows, and swallows; and the structure of carnivorous animals must have been quite different from what it now is; and if fish did not live upon the inhabitants of the water, how would they be able to subsist? Besides, if the wars among animals were to cease, they would lose much of their vivacity and industry, the creation would be less animated, and man himself would lose much of his activity. We may also add, that we should be deprived of many striking proofs of God's wisdom, if universal peace was to prevail among animals; for the address, sagacity, and wonderful instinct which they use in laying snares for and surprising their prey, very evidently manifest the wisdom of the Creator.

So far then is the enmity which exists among animals from darkening the wisdom and goodness of God, that they receive additional brilliancy from what superficial observers think an imperfection. It forms part of the plan of the great system of nature, that one animal should persecute and feed upon another. We might indeed complain of this arrangement, if it occasioned the entire destruction of any species; but this never happens, and the continual wars among animals preserve a proper balance between them. Thus carnivorous animals are indispensable links in the chain of beings; and on this account their number is very small, compared with that of useful animals. We may also remark that the strongest and fiercest animals have commonly the least sense and cunning. They either mutually

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destroy each other, or their young ones serve as food for other beasts. Hence also nature has granted to the weakest species so much industry and means of defence. They possess instinct, acuteness of sense, quickness, skill, and sagacity, sufficient to counterbalance the strength of their enemies.

Can any one then behold this without acknowledging the infinite wisdom of the Creator, and confessing that this state of warfare, which at first seems so strange, is in fact a real good? We should be still more convinced of it, if we were better acquainted with the whole system of things, and the relations and connexions which different creatures have with each other; but this is a degree of knowledge reserved for a future state, where the divine perfections will be manifested in infinite splendour. We may, however, in some measure, even in this world, comprehend why these hostilities among animals are necessary; but we can by no means conceive why men, whose nature is so much more noble, should be continually fomenting wars and divisions so destructive to their race. To the disgrace of humanity, and the eternal reproach of the Christian religion, men pursue wars, and destroy each other with more savage barbarity than the wildest beasts that range the forests; than which, nothing is more opposite to the great ends for which they were created. Surely man was designed to render himself useful to his fellow-creatures, to contribute all in his power to their comfort and happiness; to be the defender of the helpless, the benefactor of the poor, and the friend of the afflicted and unfortunate. Let us not counteract these merciful designs of our blessed Lord, but endeavour to live in that peace and harmony which becomes the children of God, and followers of an humble and crucified Saviour; leaving animals which are destitute of reason to quarrel, fight, persecute, and destroy one another; whilst we live in charity with all men, doing good unto others, as we would that they should do unto us.

SEPTEMBER XXIII.

MORAL USES OF NIGHT.

At this time of the year, when the days begin to grow shorter, and the nights to lengthen, many people are discontented with the change. Some wish that there was no night at all, or that at least throughout the year the nights were never longer than they are in the months of June and July. But such wishes are the offspring of folly and presumption, and betray the greatest ignorance; for if men reflected upon the advantages which result from the alternation of the day and night, they would not thus show their want of judgment, nor make such ill-founded complaints, but would rather bless God for the benefits they receive from the night. We feel the moral utility of night in its interrupting the course of many vices. During

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the hours of darkness the wicked are obliged to repose, and oppressed virtue gains some moments of relief and cessation from misery; the unjust and fraudulent merchant ceases to cheat his neighbour, and a thousand evils are interrupted in their progress.

If there was no night, how much pleasure and instruction we should lose! The wonders of the creation manifested in the starry heavens would be lost to us. We now every night can contemplate the grandeur of God displayed in the stars, whilst we raise our souls towards him in humble and reverent gratitude. If then every occasion which recalls God to our minds is precious, how much ought we to value the season of night, which so powerfully declares the perfections of God!

Night is a time which is well adapted for meditation and reflection. The tumult and dissipation of the day leave but little leisure for self-examination; and afford little opportunity of detaching our affections from the earth, and of seriously occupying ourselves with considering the duties of our station, and the end for which we were created. To these salutary meditations the stillness of the night is peculiarly adapted: we may then commune with our hearts without interruption, and acquire the important science of knowing ourselves. The soul will then collect all her powers, and direct them towards those subjects which concern our eternal happiness. In those moments of peace and tranquillity we may purify our hearts from the contagion of the world, and strengthen our minds against the temptation and alluring examples of those who float down the stream of pleasure. We may then reflect upon death, and meditate upon futurity: the calm solitude of our closets is favourable to religious thoughts, and our souls become more and more desirous of virtue. Let us then, instead of repining at the vicissitudes of light and darkness, be thankful for them; and every night, before we lie down to sleep, let us bless the season in which we have become better acquainted with our own nature, the glory of God, and those things which concern our salvation and eternal peace.

SEPTEMBER XXIV.

MAN'S INDIFFERENCE FOR THE WORKS OF NATURE.

[illegible] that men in general are so indifferent about the works[illegible] re? The consideration of this question may give rise [illegible]ant reflections. One great cause of this indifference [illegible]tention. We are so accustomed to the beauties of [illegible]lect to admire the wisdom which stamps them all; [illegible]fficiently grateful for the numerous advantages [illegible]m them. There are too many people who resem[illegible] which feeds upon the grass of the meadow, and [illegible]he stream, without acknowledging the wisdom

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of him from whom these benefits proceed. Some men, even though endowed with the brightest faculties, and hence enjoying a greater share of the blessings of nature, never think of the source whence they all flow: and even when the wisdom and goodness of God are most strikingly manifest, they are not affected by them, because they are so frequent. Thus what ought chiefly to excite men's admiration and gratitude renders them indifferent and insensible. Many people are also regardless of the beauties of nature through ignorance. How many are there entirely unacquanted with the most ordinary phenomena! They daily see the sun rise and set; their fields are watered with rain and dew, and sometimes with snow; every spring unfolds the most wonderful changes; but they had rather live in the profoundest ignorance than give themselves the trouble of inquiring into the causes and effects of these phenomena. It is true that many things will always be incomprehensible to us, with whatever care we study, and the limits of our understanding are never sooner felt than when we attempt to fathom the operations of nature. We may however acquire an historical knowledge of them, and the meanest labourer may be made to comprehend how it happens that the grain which he sows in his fields buds, and shoots up into a plant.

Other men, again, neglect the works of nature, because they are too much occupied with their own particular interests. I have little doubt that if spiders spun threads of gold, if lobsters contained pearls, and if the flowers of the fields converted the decrepitude of age into the vigour of youth, there would be many more attentive observers of nature than there now are. We are too apt to estimate things only as they affect our interest and our fancy: those objects which do not immediately satisfy our inordinate desires are deemed unworthy of our attention, and our self love is so unreasonable, and we so little know our real interest, that we despise what is most useful to us. Thus corn is one of the plants most indispensably necessary to our support, and yet we see whole fields waving with this useful production of nature, without paying any attention to it.

Many people disregard the works of nature out of mere indolence. They love too well their ease and repose to curtail their sleep a few minutes whilst they may contemplate the starry heavens; they have not resolution to quit their beds in a morning early enough to behold the rising sun; they fear it would fatigue them too much if they stooped to the ground to observe the structure of a blade of grass; and yet these very people, who are so fond of their ease and convenience, are full of eagerness and activity in the gratification of their passions.

Others neglect the works of God in nature from irreligious motives; they do not desire to know the greatness of God, and have no inclination for virtue, nor the duties which it prescribes. To love and to praise God, and to be grateful for his blessings, would be to these men duties painful and disagreeable. We have too much reason to believe that this is one of the principal causes of some men's disregard for the works of God. If they prized the knowledge of God above all other things, they would eagerly seize, and cherish with pleasure, every

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opportunity of strengthening that knowledge, and of perfecting their love of their heavenly Creator.

At least two-thirds of mankind may be ranked in one or other of the classes which we have just pointed out; for there are very few people who properly study the works of God, and who love to dwell upon them. This is a truth, the mournful certainty of which is daily confirmed. Would to God that men would at length be convinced how it becomes them to be so insensible and inattentive to the works of the Creator, and how by such a conduct they degrade themselves below the very brutes! Have we eyes, and shall we not contemplate the wonders that every where surround us? Have we ears, and shall we not hearken to the glad songs which make the heavens resound with the praises of the Creator? Do we wish to contemplate God in the world to come, and yet refuse to consider his works in which he shines so conspicuously in the garden of nature? Let us henceforth renounce this culpable indifference, and endeavour to feel a portion of that joy which formerly penetrated the heart of David, when he reflected on the works, the glory, and the magnificence of his God.

SEPTEMBER XXV.

OF SEVERAL NOCTURNAL METEORS.

In serene weather, when the sky is clear, we sometimes observe a circular light, or luminous ring surrounding the moon, and which is called a halo or crown. Its outline frequently exhibits, though faintly, the colours of the rainbow. The moon is in the centre of this ring, and the intermediate space is generally darker than the rest of the sky. When the moon is at the full, and considerably elevated above the horizon, the ring appears most luminous. It is often very large. We are not to suppose that this circle really surrounds the moon; the true cause of such an appearance must be looked for in our atmosphere, the vapours of which cause a refraction of the rays of light which penetrate them, and produce this effect.

False moons, called paraselenes, or mock moons, are sometimes seen near the real moon, and appear as large, but their light is paler. They are generally accompanied by circles, some of which have the same colours as the rainbow, whilst others are white, and others have long luminous tails. All these appearances are produced by refraction. The rays of light falling from the moon upon aqueous and sometimes frozen vapours, are refracted in various ways; the coloured rays are separated, and reaching the eye double the image of the moon. A very rare appearance is sometimes observed; we see by moonlight, after heavy rain, a lunar rainbow, which has the same colours as the solar rainbow, but much fainter; this meteor is also occasioned by the refraction of the rays of light.

When sulphurous and other vapours take fire in the superior part

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of the atmosphere, we often see streaks of light rapidly darting like rockets. When these vapours unite together in one mass, and becoming ignited fall down, we seem to perceive little balls of fire fall from the sky; and as, from their distance, they appear to be about the size of stars, they are often called falling stars, and many people imagine they are real stars, which change their places or are dissipated. Sometimes these supposed stars, very brilliant, and splendidly coloured, slowly descend, acquiring new lustre, till at length they are extinguished in the lower atmosphere. Large balls of fire have sometimes been seen more resplendent than the full moon, and some of them with long luminous tails. It is very probable that these are sulphurous and nitrous vapours, which have accumulated and become ignited; they generally pass through the air with great rapidity, and then burst with a loud report. Sometimes, when the inflammable particles of which they are composed are of a different nature, they disperse without noise in the higher regions of the atmosphere. The little flashes which we often may observe in the summer evenings after intense heat, are produced by the vapours of the atmosphere; and are less visible, because they are more elevated. This meteor is distinguished from real lightning, by not being accompanied by thunder; or rather, these lights are the reflection of lightning at too great a distance for us to hear the thunder-clap which follows.

The flying dragon, the dancing goat, the burning beam, and various other meteors, owe their names to the singular appearance which they present. They are only gross and viscous exhalations which ferment in the humid regions of the lower sky, and which being pressed in several directions by the agitated atmosphere, assume different figures, to which people give these extraordinary names. Experimentalists have imitated these phenomena by the combination of certain inflammable substances.

Of all the nocturnal phenomena, none are more remarkable or brilliant than the aurora borealis, or northern lights, which are generally seen from the beginning of autumn till the commencement of spring, when the weather is calm and serene, and when the light of the moon is not great. The aurora borealis does not always appear the same. Commonly towards midnight a light is perceived something resembling the first breaking of day. Sometimes also we observe streams, and sudden shoots of light, and white and luminous clouds which are in constant motion. But when the aurora borealis shows itself in full perfection, we almost always see during mild weather, towards the north, an obscure space, a thick and dark cloud, the upper part of which is surrounded by a white and luminous border, from which rays, brilliant jets, and resplendent pillars proceed, which every moment as they rise assume red and yellow colours, then meet, unite and form thick and luminous clouds, and at length terminate in variously coloured clouds, white, blue, fiery red, and the most beautiful purple.

How great is the magnificence of God! Even night itself proclaims his majesty. How can we complain that at this season the nights

are gradually becoming longer, when they present such grand and sublime spectacles, that both interest our minds and our hearts? The phenomena which we have been describing render the long nights of the northern nations not only supportable, but even pleasing and brilliant. Our nights, which are much shorter, might still procure us very diversified pleasures, if we would be attentive to them. Let us accustom ourselves to raise our minds and our hearts towards heaven, and soar in thought beyond moons and stars unto our Creator; reflect upon his grandeur, and adore him in silence, when the sublimity of the night shall fill our souls. For thou, O Lord, art great! The solemn stillness of the night attests thy power and love. The moon silently revolving in the azure plains of heaven, displays thy majesty. All the host of stars flaming in the firmament praise and celebrate thee; and the paler light of the aurora borealis, streaking the evening sky, manifests the perfections of our God.

SEPTEMBER XXVI.

AMPHIBIOUS ANIMALS.

Besides quadrupeds, birds, and fish, there is a species of animal which can live either on the earth or in the water, and is on this account termed amphibious. The animals of this class are all cold blooded, and have something forbidding in their look and figure; their colour is dark and disagreeable; and they have an unpleasant smell, with a hoarse voice; and many of them are venomous. Instead of bones, they have only cartilages; their skin in some instances is smooth, in others covered with scales. Most of them live concealed in dirty, swampy places; some are oviparous. These last do not hatch their own eggs; but abandon them to the warmth of the air, or water, or lay them on a dunghill. Almost all this species of animals live upon prey, which they obtain either by their superior strength or cunning. They can long support famine, and in general live a very laborious life. Some of them walk, others creep, and this difference occasions them to be divided into two classes. In the first class may be enumerated those which have feet. The tortoise, which is in this class, is covered with a strong shell resembling a buckler: land tortoises are smaller than those that live in the sea, some of which are five ells long, and weigh from eight to nine hundred pounds.

There are several species of lizards; some with smooth skins, others are covered with scales; and some have wings, and are called dragons. Among those that have no wings are the crocodile; the cameleon, which can live six months without food; and the salamander, which can live in the fire some time without being consumed, because the cold and slimy fluid which it throws out from all parts defends it from the effects of the heat. Of all these animals the

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crocodile is the most formidable; it first proceeds from an egg not larger than that of a goose, and attains to the immense length of from twenty to thirty feet. It is cruel, voracious, and extremely cunning.

Serpents form the second class of amphibious animals. They have no feet, but creep along by a winding vermicular motion, by means of the scales and rings that cover their bodies; and their spinal vertebræ have a peculiar structure to favour this motion. Some serpents are said to possess the property of fascinating birds, and the small creatures they wish to prey upon; these, seized with a sudden fear at the sight of the serpent, and perhaps stupified by the poisonous and fetid exhalations it emits, have no power to fly, and fall an easy prey into the gaping throat of their adversary. The jaws of serpents can be opened to such an extent, that they are able to swallow animals of a larger bulk than their own heads. Some serpents have fangs in their mouths resembling their other teeth, and they act as a sort of dart which they can push in and out as they please; and by this means they insert into the wound which they make a poisonous humour, which is ejected from a little bag placed at the root of the tooth. This poison has the peculiar property of only being hurtful to parts where the flesh has been wounded, for it may be taken internally without danger. The serpents thus armed form but about the tenth part of the whole species; none of the others are venomous, though they dart at men and animals with as much fury as if they could hurt them. The rattlesnake is by far the most dangerous. It is commonly from three to four feet long, and about as thick as the thigh of a man. Its smell is strong and disagreeable; and it seems as if nature had designed this, as well as its rattles, to warn men of its approach, that they might have time to avoid it. This reptile is most furious when tormented by hunger, or when it rains. It never bites till it has coiled itself in a circle; but it assumes this form with incredible quickness: to coil itself up, to rear itself upon its tail, to dart upon its prey, to wound it, and to retire, is but the work of a moment.

Perhaps it will be asked why God has created a species of animals that only seem to exist for the torment and destruction of man? This and similar questions show that we only think of ourselves, that we are too hasty in forming our judgments, and too much disposed to blame the works of God. Considered in this point of view, such questions are very reprehensible; but if we ask them for the purpose of being more convinced of the wisdom and goodness of God in the works of the creation, they are not only commendable, but absolutely necessary for every reflecting person to ask. To those then who inquire for the sake of information, and further advancement in the things of God, I wish to address myself. Perhaps it may appear to you that such creatures as lizards and serpents could not have been created for the general good of the world. But this is a rash opinion; for if among amphibious animals there are some which do too much mischief, it is certain that the greater part of them are harmless

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And is it not a proof of God's goodness, that not more than the tenth part of serpents are venomous? And even those which are mischievous have their bodies so formed, that it is generally possible to escape their attacks. Thus, however formidable is the rattlesnake, it cannot conceal its approach; its odour and rattles giving sufficient warning. It is also worthy of remark, that Providence has opposed to this dangerous animal an enemy able to conquer it. The sea-hog every where seeks and devours it with avidity; and a child is strong enough to kill the most terrible of these reptiles, for a very slight blow with a stick across their backs almost instantly kills them. Besides, it would be extremely unjust only to dwell upon the mischief these creatures may do us, without considering the advantages which they actually procure us. Some of them are beneficial as nourishment; others supply us with medicines; and the shell of the tortoise is useful for many purposes. In short, the wisdom and goodness of God are not less conspicuous in this than in all other parts of the creation. To reflect upon his divine perfections, to admire and to adore them, is our duty when we see animals which appear to be injurious to us; but never let us complain of his arrangements, or murmur at his dispensations: it would be still more culpable with regard to these creatures, because our faculties are too limited to comprehend the various uses for which they may be designed.

SEPTEMBER XXVII.

PERFECTIONS OF THE WORKS OF GOD.

What can equal the perfection of the works of God? and who can describe the infinite power which is displayed in them? It is not only that their immensity, number, and variety fill us with admiration; but each work in particular is formed with such infinite art, that each is perfect in its kind, and the wonderful proportion and regularity of the smallest productions display the boundless intelligence and grandeur of their Author. We are justly astonished at the different arts which the moderns have invented, and by means of which they execute things that would have appeared to our ancestors as supernatural. We measure the height, the breadth, and the depth of bodies, we know the orbits of the stars, and we can direct the course of rivers; we can elevate or depress waters, construct buildings to move upon the sea, and perform many other works which do honour to the human understanding. But what are all the inventions of man, his most magnificent and beautiful productions, in comparison of the least of the works of God? How weak and imperfect imitations, how far below the original? Let the most eminent artist exert all his skill to give his work a pleasing and useful form; let him polish and perfect it with all his art and care; and after all his labours, industry, and efforts, let him examine his performance through a microscope, and

see how coarse, ill-shaped, and rough it will appear! He will discover how great is its want of regularity and proportion. But whether we examine the works of the eternal God through a microscope or with the naked eye, they bear the minutest examination, and the closest inspection; they are always admirable, always beautiful, of an exquisite form and order, of an incomparable symmetry.

Divine wisdom has formed and arranged all the parts of every body with infinite art, and wonderful harmony and proportion. Such is the prerogative of unlimited power, that admirable order reigns throughout the creation; from the greatest to the most minute productions of nature, all is harmony; every thing is so well connected that no void is perceptible, and in the vast catenation of created beings not a single link is wanting; nothing is out of place or defective, every thing is necessary to the perfection of the whole, and each part, separately considered, will be found perfect in itself. It is impossible to describe the numberless beauties, the ever-varying charms, the beautifully blended shades of colouring, the rich hues, and diversified ornaments of the meadows and the valleys; of the mountains and the forests; of the plants and the flowers! Is there a single work of God which has not its peculiar characteristic beauty? Is not that which is the most useful at the same time the most pleasing? What an astonishing variety of forms, figures, and dimensions, do we not discover in the inanimate part of the creation? But a still greater diversity is observable among animated beings, and yet each individual is perfect in its kind, without any thing to add or diminish. How powerful and infinite then must be that being, by a single act of whose will so many creatures rose into existence.

But to admire the grandeur and power of God we need not go back to that remote period of time, when at his word every being rose out of nothing, every thing was created in an instant, and in a moment attained its full perfection. Do we not now behold at the return of each succeeding spring a new creation? What can be more admirable and striking than the revolution which then takes place? At the close of autumn, the valleys, the fields, the meadows, and the forests gradually droop, and appear to die; nature, during the winter, loses all her beauties; the very animals languish, the little birds hide themselves, and no longer pour their swelling notes through the groves, where not a green leaf is seen, but all is desert, and nature mourns her faded charms. Yet at this very time a secret power is working for her renovation, without our being conscious of its influence; life again animates the torpid bodies; and they are preparing to undergo a kind of resurrection.

How can we so often witness this magnificent spectacle without admiring, in humble adoration, the power and glory of the eternal God, who has given to the trees their foliage; to the flowers their beauty and fragrance; to the woods and to the meadows their delightful verdure; and who has caused bread, wine, and oil to spring up from the earth, to make glad the heart of man? O Lord, how great and manifold are thy works! Thou hast made them all with wis-

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dom: the earth is full of thy riches. I will never recline beneath the shade of a spreading tree, and view the fields gay with flowers, the corn waving in rich luxuriance, or see the distant forests, without joyfully remembering that it is my God and heavenly protector who has thus clothed the creation in beauty.

SEPTEMBER XXVIII.

FRUITS.

This is the blessed season in which the divine goodness lavishes upon us fruits of every kind in plentiful abundance. 'The charms of summer are succeeded by solid enjoyments; delicious fruits replace the faded flowers. The mellow apple, whose golden brilliancy is heightened by the rich streaks of purple, weighs down the branch which bears it; the luscious pears and plums, whose juice is sweeter than honey, display their beauties, and invite us to pluck them.' How inexcusable and selfish are those people, who, at the sight of all these blessings, which the munificence of God bestows upon them, never have any good thoughts arise in their souls, nor endeavour to sanctify the pleasures of autumn by reflecting on the kindness of their God!

How wisely has the Creator distributed fruits in the different seasons of the year! Though summer and autumn are generally the times when nature produces these rich gifts, with the assistance of art we can obtain them both in spring and in winter, and our tables may thus be provided with fruit all the year round. As early as the month of June, nature produces of herself, unaided by art, raspberries, gooseberries, and cherries. The month of July furnishes our tables with peaches, apricots, and some kinds of pears. In August fruits appear in the most lavish profusion; figs, late cherries, and a variety of delicious pears. September gives us grapes, winter pears, and apples; and October yields more varieties of the same kinds of fruits.

Thus nature distributes her gifts with the wisest economy, so that without having them in too great abundance, we enjoy an ample variety, and constant succession. And though as winter approaches the number and variety of fruits begin to diminish, we are still able to preserve many of them for use during the whole of this season. Providence has not designed man to be idle, but has intended him to be always active, and to labour to supply his wants; hence he has distributed his blessings with such diversity, and has so formed them, that if proper care is not taken to preserve them they will spoil, and be of no value.

How great is the abundance of fruits, and the profusion with which they are distributed! Though birds and insects are continually feeding upon them, we have yet a sufficient quantity left for use. If we

could calculate how much fruit a hundred trees would produce in a favourable year, we should be astonished at the immense quantity. Why is there such an abundance of fruits, if not to supply men with nourishment, and particularly those who are poor and destitute? In giving to them these fruits, so plentifully, Providence has supplied them with a cheap, nourishing, and wholesome food, and so agreeable that they have no cause to envy the rich their seasoned and often unwholesome viands.

Few kinds of aliment are more salubrious and nourishing than fruits: and we ought to consider it as a merciful care of God, that he has given them to us in a season when they may be used as most excellent remedies, as well as refreshing and pleasant food. Nothing is more delicious than fruit; each species has a taste peculiar to itself, and it is certain they would lose much of their value if they had all the same flavour; their variety renders them more exquisite, and delectable. Thus Providence, like a tender parent, not only provides for the support of his creatures, he also ministers to their pleasures. May it be our fondest delight, and most pleasing duty, to devote ourselves to the service of so kind a Father! How great will our happiness be, if we give ourselves up to him with full purpose of heart! What sweet consolation, and pure and exalted pleasures, shall we then taste! What bright hopes may we not indulge for happiness in our future existence!

SEPTEMBER XXIX.

HYMN OF PRAISE, IMITATED FROM PSALM CXLVII.

Praise ye the Lord, for he is omnipotent! He telleth the number of the stars, and calleth each by its name. Thou earth, and ye heavens, celebrate him; his name is great and glorious; the sceptre of his power rules over you with majesty; celebrate the Almighty!

Unite your voices to bless the God of mercy! Ye who are distressed, come unto him; come to your Father; he is gentle, merciful, and gracious; a God of peace, charity, and love.

The heavens become dark; but it is to water the earth with fruitful rains. Verdure beautifies our fields; grass grows, and fruits ripen; for the clouds pour from heaven the bounty of our God, who is full of kindness. Let every thing that breathes glorify the Lord! Beasts and birds, fish and insects, nothing is forgotten, all the objects of his care, all are nourished by his bounty. Let us praise and celebrate our heavenly Father!

O how he supports and comforts those who trust in his mercy, and confide in his power! One friend often cannot save another, and the utmost strength of man cannot save him from danger. Alas! wretched is the mortal who seeketh vain supports! Put not your trust in princes, nor in the sons of men, in whom there is no help; but repose

on the Rock of Ages, your Saviour and your God. His word is a source of life and salvation. O ye who are of his covenant, how great is your happiness! Praise, exalt, and celebrate the God of truth and mercy!

SEPTEMBER XXX.

INVITATION TO PRAISE GOD.

Great is the Lord; innumerable heavens are his pavilion; the thunder-cloud is his chariot, and the lightning walketh by his side.

The lustre of the morning is but the reflection of the hem of his garment; when his splendour goes forth the light of the sun is eclipsed.

Praise the eternal God, ye luminaries of his palace: ye solar rays, flame his glory: thou earth, lift up thy voice and sing his praise. Celebrate him, thou sea; foam, ye billows, to his honour; ye rivers, praise him in your course! Roar, ye lions of the forest, to his glory! Sing unto him, ye feathered inhabitants of the air! Resound his praises, ye echoes! Let all nature, in harmonious concert, chant his honour! And thou, O man, lord of this lower world, mingle thy thanksgiving with the universal song! God has done more for thy happiness than for all the rest: he has given thee an immortal spirit, which enables thee to comprehend the structure of the universe, and to become acquainted with the springs of nature.

Praise him when the sun rises from his ruddy bed, and paints the east with glory; praise him when his departing beams faintly irradiate the western horizon: with the voice of univeral nature, unite thy accents, tuned to his praise. Praise him in the rainy and in the dry seasons; in the tempest and in the calm; when the snow falls, when the ice stops rivers in their course, and when verdure covers the face of the earth. Exalt him for thy own salvation: when thou soarest up to him, all low desires and base inclinations shall leave thy heart, and thou shalt retire with greater elevation of thought and purity of soul.

OCTOBER I.

A HYMN IN PRAISE OF GOD.

All the hosts of heaven glorify the power and majesty of the Creator; and all the spheres which roll in the immensity of space celebrate the wisdom of his works. The sea, the mountains, the forests, and the deeps, all created by a single act of his will, are the heralds of his love, and the messengers of his power.

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Shall I alone be silent, and not chant hymns to his praise? My soul longs to soar up to his throne; and though my language may be feeble, my tears will express the love which I feel for my heavenly Father and Protector. Though my tongue falter, and my broken accents declare my weakness, the most high God sees through my heart, and gladly receives the pure incense which ever burns there on his holy altar. But how shall I praise thee, who art far above all praise? Could I take the sunbeams for my pencil, I could not sketch a single ray of thy essence. The purest spirits can offer thee but imperfect praise. By what power do millions of suns shine with so much splendour? who has marked out the wonderful course of those revolving spheres? What chain unites them, and what power influences them? It is the breath, the word of Jehovah our God.

The Lord called the worlds, and they moved in their spheres through the space of heaven. Then was our world produced; the birds, the fish, the cattle, and the wild beasts that sport in the forests; and to complete all came man to inhabit the earth, and receive joy in its productions. Our sight is delighted with smiling and varied prospects; our eyes wander over the green plains, or contemplate forests that seem to rise into the clouds; they view the sparkling dew-drops of morning that water the flowers, or they pursue the windings of the limpid stream which reflects the trees.

To break the force of the winds, and to offer us the most lovely views of nature, the mountains rear their lofty summits, and from them flow the purest streams. The dry valleys and parched fields are watered by rain and dew, and the air is cooled with the gentle breeze.

It is our God who directs the spring to unfold a green carpet under our feet; it is he who gilds the ears of corn, and tinges the grapes with their purple hue; and when cold descends to benumb nature, he wraps her in a pure mantle. Through him the human mind penetrates the abode of the stars, recalls the past, anticipates the future, and discerns the evidence of truth from the delusion of error; and by his power we conquer death, and escape from the tomb. Unto the mighty God of the universe then be ascribed all honour, glory, and renown, for ever and ever!

OCTOBER II.

EFFECTS OF FIRE.

Nothing in nature can exceed the violent effects of fire; and the extreme rapidity with which ignited particles are put in motion is altogether astonishing. But how few people attend to these effects, or deem them worthy of their observation! Yet in our domestic affairs we daily experience the beneficial influence of fire, and perhaps on this very account we are less attentive. I wish, then, in the present

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reflection, to make my readers call to mind this great blessing of Providence, and, if possible, cause them to feel its full value.

One effect of fire, and which must be familiar to every person, is that of dilating such bodies as are exposed to its influence. A piece of iron made to fit a hole in a plate of metal, so that it easily passes through when cold, being heated cannot be made to enter; but upon being again cooled, readily passes into the hole as at first. This dilatation, caused by the heat, is still more perceptible in fluid bodies, as spirits, water, and more particularly air; and upon this principle our thermometers are constructed.

If we observe the effects of fire upon compact and inanimate substances, we shall find that they soon begin to melt, and are changed partly into a fluid and partly into a solid of a different nature. It communicates fluidity to ice, oil, and all fat substances, and most of the metals. These bodies are rendered susceptible of such changes, from their combination being more simple and their particles more homogeneal than those of other bodies. The fire consequently penetrates their pores more readily, and succeeds sooner in separating the parts from each other. Hence some of these matters evaporate when the fire penetrates them in too great a quantity, or with too much force. Some solid bodies undergo other changes; sand, flint, slate, quartz, and spar, become vitrified in the fire; clay is converted into stone; marble, calcareous stones, and chalk, are changed into lime. The diversity of these effects does not proceed from the fire, but from the different properties of the bodies upon which it acts. It may produce three kinds of effects upon the same body; it may melt, vitrify, and reduce it to lime, provided that the matter possesses the three necessary properties of being metallic, vitrifiable, and calcareous. Thus fire of itself produces nothing new; it only develops in bodies those principles which before its action were not perceptible.

Upon fluids fire produces two effects; it makes them boil, and converts them into vapour. These vapours are formed of the most subtile particles of the fluid separated by the fire, and they ascend in the air because they are specifically lighter than that fluid. In living creatures fire produces the sensation of heat in every part of the body: without this element man could not preserve life; a certain degree of heat is necessary to give vitality and motion to the blood, for which purpose we are constantly inhaling fresh air, which always contains the matter of heat, and imparts it to the blood in the lungs, whilst this organ of respiration expels the air that has lost its vivifying properties.

The above reflections ought to confirm in our minds the important truth, that Providence has constantly in view the welfare of man, and is ever giving us proofs of his divine love. How numerous are the advantages which the effects of fire alone procure us! By the intimate union of fire and air the seasons are renewed, the moisture of the soil and the health and life of man supported; by the action of fire water is put in motion, organized bodies are brought to a state of perfection, the branch is preserved in the bud, the plant in the seed,

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and the embryo in the egg; it serves to prepare our food, contributes to the formation of metals, and renders them fit for use.

In short, when we collect the different properties of fire, we must be convinced of the numerous blessings which the Creator has by its means diffused over the globe; a truth which ought to call forth our love and gratitude for the Author of our being, and fill our minds with contentment and a perfect reliance upon God.

OCTOBER III.

THE INSTINCT AND INDUSTRY OF BIRDS.

Birds afford us many innocent pleasures, and now that some of them are about to disappear for a considerable space of time, let us bestow a little attention upon them, that their presence may rejoice us, and make us think with gratitude and pleasure upon God, who is their Creator as well as ours. It is very pleasing to observe the different instincts which he has given to them. None of these instincts are useless or superfluous, each is indispensably necessary to the preservation and well-being of the bird; and however little we know of them, it is sufficient to give the highest ideas of the wisdom and goodness of God.

When we reflect upon that particular instinct which incites birds to move, we may find in that alone just cause of admiration. Experience convinces us that corporeal motion requires something more than mere strength, and limbs supple and well formed. It is not till after many essays and falls that we can preserve our balance, walk with ease, run, leap, sit down, and rise up again; and yet to a body constructed as is ours, these motions seem to be much easier than they are to birds. These animals also have only two feet, but their bodies do not rest perpendicularly upon them; they project before as well as behind, and yet a chicken will stand upright, and run about almost as soon as it leaves the egg. Young ducks which have been hatched by a hen know their own element, and swim in the water without having been directed by example or instruction. Other birds know how to rise from their nests into the air, balance themselves, and pursue their course through the air, making equal strokes with their wings; stretch their feet, spread out their tails, using them as oars, and perform long voyages to countries very remote from the place of their nativity.

How admirable also is the art which they use to obtain a subsistence; an art which they bring into the world with them? Certain birds, though not aquatic, live upon fish; consequently they ought to find it more difficult to seize their prey than is the case with waterfowl. Who teaches them this instinct? They stand on the brink of the water, and when they perceive at a distance a shoal of fish advancing, they pursue them, skim along the surface, and suddenly plung

ing in the water seize upon a fish. Who has given to birds of prey their piercing eye, courage, and weapons, without which they could not obtain the means of subsistence? Who teaches the stork where to find frogs and insects to feed upon? To procure them she must carefully traverse the meadows, and seek them in the furrows of the field; and she must prolong her search till morning, when other birds begin to awake. What incredible strength the condor must possess, since it is said to carry off a deer, and prey upon an ox! How can we reconcile with the savage nature of the quail that maternal instinct, which makes her adopt young birds of any species, and not only take them under her protection, but lavish upon them her most tender cares? What cunning the crow uses to hide the prey which she cannot devour at once! She carefully conceals it in places that other crows are not liable to frequent; and when hunger again presses her, she well knows the magazine where she had hoarded her treasure.

We might make many more observations of this kind, without being at all able to explain all the mysteries in the instinct of birds: but the little that we know of them is sufficient to dispose those whose minds are open to contemplate the works of nature to follow still more noble pursuits. Let us not confine ourselves to the consideration of the instincts and properties of birds, which ought only to be regarded as a first step leading to more sublime meditations; but let the admiration which these raise in us elevate our souls to the God from whom these animals have received all their faculties, and who has prepared and combined so many things for the continuance and multiplication of this part of his creatures.

OCTOBER IV.

ANIMAL REPRODUCTIONS.

Here we discover a new field of wonders which seem wholly to contradict the principles which we had adopted concerning the formation of organized bodies. It was long supposed that animals could only be multiplied by eggs, or by young ones. But it is now found that there are some exceptions to this general rule, since certain animal bodies have been discovered which may be divided into as many complete bodies as we please? for each part thus separated from the parent body soon repairs what is deficient, and becomes a complete animal. It is now no longer doubtful that the polypus belongs to the class of animals, though it much resembles plants both in form and in its mode of propagating. The bodies of these creatures may be either cut across or longitudinally, and the pieces will become so may complete polypi. Even from the skin, or least part cut off from the body, one or more polypi will be produced; and if several pieces cut off be joined together by the extremities, they will perfectly unite, nourish each other and become one body.

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This discovery has given rise to other experiments, and it has been found that polypi are not the only animals which live and grow after being cut in pieces. The earth worm will multiply after being cut in two; to the tail part there grows a head, and the two pieces then become two worms. After having been divided, they cannot be joined together again; they remain for some time in the same state, or grow rather smaller; we then see at the extremity which was cut, a little white button begin to appear, which increases and gradually lengthens. Soon after we may observe rings, first very close together, but which insensibly extend on all sides; a new stomach and other organs are then formed.

We may at any time make the following experiment with snails: Cut off their heads close by their horns, and in a certain space of time the head will be reproduced. A similar circumstance takes place in crabs; if one of their claws is torn off, it will again be entirely reproduced.

A very wonderful experiment was made by Duhamel on the thigh of a chicken. After the thigh-bone, which had been broken, was perfectly restored, and a callus completely formed, he cut off all the flesh down to the bone; the parts were gradually reproduced, and the circulation of the blood again renewed. We must acknowledge then that some animals may be multiplied by being divided into pieces; and we no longer doubt that the young of certain insects may be produced in the same manner as a branch is from a tree; that they may be cut in pieces, and live again in the smallest piece; that they may be turned inside out like a glove, divided into pieces, then turned again, and yet live, eat, grow, and multiply. Here a question offers itself which perhaps no naturalist can resolve in a satisfactory manner. How does it happen that the parts which are thus cut off can be again reproduced? We must suppose that germs are distributed to every part of the body, whilst in other animals they are only contained in certain parts. These germs unfold themselves when they receive proper nourishment. Thus, when an animal is cut in pieces, the germ is supplied with the necessary juices, which would have been conveyed to other parts if they had not been diverted into a different channel. The superfluous juices develop those parts which without them would have continued attached to each other. Every part of the polypus and worm contains in itself, as the bud does the rudiments of a tree, all the viscera necessary to the animal. The parts essential to life are distributed throughout the body, and the circulation is carried on even in the smallest particles. As we do not understand all the means which the Author of nature makes use of to distribute life and feeling to such a number of animals, we have no reason to maintain that the creatures of which we have been speaking are the only ones which form exceptions to the general rule, in their mode of propagating. The fecundity of nature, and the infinite wisdom of the Creator, always surpass our feeble conceptions. The same hand which has formed the polypus and the worm has also shown us that it is able to simplify the structure of animals.

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OCTOBER V.

THE ORGANS OF TASTE.

We should possess fewer sources of pleasure if we had not the faculty of distinguishing, by our taste, different kinds of food. The great variety of fruits which abound in this season may naturally induce us to reflect upon this subject. Our pleasure would be considerably diminished if the apple, the pear, the plum, and the grape, all had the same flavour. The faculty of distinguishing them, or the sense of taste, is a gift of God's goodness, and a proof of his wisdom, which deserves our utmost gratitude.

What are the means which enable us to taste and distinguish our food? The tongue is the principal organ: for this purpose the surface is furnished with nervous papillæ, by means of which we receive the impression of taste. This structure is evident upon dissecting the tongue; for having taken off the membrane which covers it, numerous roots where the nerves terminate appear; and it is precisely where these nervous papillæ are found that we have the sensation of taste; when they are wanting, we have no sense of tasting. When we put highly flavoured things under our tongue, we have scarcely any perception of them till they are attenuated and brought to the surface of the tongue, when we immediately become sensible of their flavour; consequently the sensation of taste is only powerful where the nervous papillæ are in the greatest quantity, and that is in the part nearest the throat.

To be still more convinced that the sense of taste depends upon the nerves, we have only to examine the tongue of a dog or of a cat. In these animals the nervous papillæ are situated towards the root of the tongue; the fore-part being destitute, whilst the palate is covered with them: hence with these animals the tip of the tongue is not susceptible of taste.

How skilfully this organ of taste is constructed, all the parts of which no anatomist has yet been able to discover! Is it not the effect of infinite wisdom, that the tongue has a greater number of nervous fibrillæ than any other part of the body, and that it is filled with little pores, that the salts and savoury parts of food may penetrate more deeply, and in greater abundance, to the nervous papillæ? Is it not owing to the same wisdom, that the nerves, whose fibres spread over the palate and throat, are also extended to the nose and eyes, as if to make these organs contribute their share in discerning our aliment? Another thing worthy of admiration is the duration of the organs of taste; however fine and delicate in their structure, they continue longer than instruments of stone and steel. Our clothes wear, our flesh decays, our bones become dry, whilst the sense of taste survives them all.

Seeing, then, that God has favoured us with faculties superior to all other creatures, let us endeavour always to exert them for the best

purposes. If we are unwilling to acknowledge the wisdom and goodness of our Creator, who else is to render him that homage? Let us reflect on the abundance we receive from the animal, vegetable, and mineral kingdoms. The heavens and the earth, the air and the ocean, contribute to our happiness; wherever we go we behold the gifts of God. From the lofty summits of the mountains, the depths of the valleys, the beds of lakes, and the bosoms of rivers, we derive sustenance and pleasure. Though it is reasonable that we should esteem and highly value this choice gift of God, yet let us not prize it beyond the design of the divine Giver. The sense of taste is bestowed on us as a means to conduct us to the noblest ends. How absurd and culpable it would be, if we made our chief happiness to consist in those pleasures of which this sense is the organ; and to live only to gratify the palate by savoury viands and delicious drinks. Let us shrink from the idea of reducing ourselves to the level of the brute, whose chief delight is in eating and drinking: and let us ever remember that we have an immortal soul, which can never be satisfied with any thing short of the Supreme Good; and to have a true relish for this good, to be desirous of being nourished by it, constitutes the wisdom and felicity of the man and the Christian.

OCTOBER VI.

OF GOD'S GOVERNMENT WITH REGARD TO NATURAL EVENTS.

All the events which take place in the heavens, upon the earth, and in the air, are regulated according to prescribed natural laws. But it would be wrong not to acknowledge the influence of a particular Providence, which directs natural things according to its own views, and makes them concur in its designs. God makes use of natural causes to chastise or to recompense men; and it is thus, for example, that at his command the air is pure or corrupt, and the seasons are fruitful or unproductive. He prevents or assists the designs of men; sometimes by winds and storms, at others by the flux and reflux of the sea. It is true, that God does not in general interrupt the course of nature; but it is equally certain that nature cannot act without his will and concurrence. The parts which constitute the visible world cannot use their power as they please; and God can influence his creatures without overturning the order of nature. Fire, water, wind, and rain, have their natural causes and peculiar properties; and God uses them to execute his designs in a manner suitable to their nature. He uses the heat of the sun to warm and fertilize the earth: he employs the winds and the rain to purify and cool the air, but always in such a way as best suits his views and purposes.

A great part of the good and evil which we experience in this state of existence proceeds from surrounding objects; and as God interests himself in every thing which happens to man, he undoubtedly has an

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influence upon those objects, and upon every part of nature; and on this are founded the rewards which he promises to virtue, and the chastisements with which he punishes vice. The one he crowns with peace and prosperity; and when he pleases sends war, famine, and pestilence to punish the other. In short, all natural causes are in the hand of God, and immediately under his guidance. Man himself is a proof of this. How frequently his industry subdues nature! Though he cannot change the essence of things, he is able to make use of natural causes, so that effects result from them which would not have taken place without the art and direction of man: But if Providence has in some degree subjected natural things to human industry, how much more rational is it to suppose he reserves to himself the supreme government and direction of all these things!

From all this we may conclude, that a particular Providence is necessary to watch over the government of the world. Natural causes are doubtless excellent instruments; but to be useful they should be under the direction of a wise governor. It would be unreasonable to desire that God should every instant change the laws of nature which he has once established; that if, for instance, a man fell into water, or in the fire, he should neither be drowned in the one case, nor burned in the other. Thus, again, it is not to be expected that Providence will preserve men who shorten their lives by intemperance; or that he will work miracles to save them from the misfortunes which they bring upon themselves, by their own misconduct and folly. But it is our duty to attribute to the guardian cares of Providence all those beneficial dispensations which minister to our wants and fill our hearts with joy. All the disorders of nature are also the effects of the power of God, and may be regarded as the means which he uses to punish men. It is under this belief that on the one hand is founded the efficacy of those prayers by which we implore the blessings of heaven, peace, and fruitful seasons; and on the other, offer up our thanksgivings, for the mercies which we have so abundantly received.

OCTOBER VII.

THE INEXHAUSTIBLE RICHES OF NATURE.

Nature is so liberal to us, so abundant in resources to supply all our wants, so rich in gifts, that they surpass in number the drops of water in the ocean.

How many different things does one single individual require during a life of sixty years! How much he wants for food and raiment, for the sweets and conveniences of life, for the pleasures, the amusements, and the duties of society; not to mention extraordinary cases, and unforeseen accidents. Every age, state, and condition of life, in every country, and among every people, from the king to the

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beggar, from the suckling babe to the old man, has its particular wants and necessities; what agrees with one does not suit another; and all require provisions, and different means of subsistence. Yet we see nature suffices for all, and provides so liberally for every want, that each individual receives all that is necessary for him. Since the first age of the world, the earth has not ceased to open her bosom; the mines are not exhausted; the sea constantly provides subsistence for a great number of creatures; plants and trees have always buds and seeds which germinate and are fruitful in the proper season. All-bountiful nature diversifies her riches, that they may not be too much exhausted in one place; and when any species of plants, fruits, or provisions, begin to diminish, she produces others; and she does it so that the desire or taste of men should lead them where her productions are most abundant.

Nature is a wise economist, who takes care that nothing shall be lost. She derives profit from every thing. Insects serve as food to greater animals; and these are always useful to man in one way or another. If they do not supply him with food, they provide him with raiment, or they furnish him with arms and weapons of defence; and if they answer none of these purposes, they at least procure him excellent medicines. If disease sweeps off some species of animals, nature repairs that loss by the increase of others. She even makes use of the dust of dead bodies, and putrid and corrupt substances, for the nourishment of some creatures, or as manure to the earth.

How rich also is nature in fine and delightful prospects! Her most beautiful dress only requires light and colours, and with these she is abundantly provided; the scene which she presents is continually varying, according to the point of view in which it is seen. And while in one place the eye is gratified with the most beautiful forms, in another the ear is charmed by melodious sounds, and the organ of smell is refreshed by the most agreeable perfumes. In short the gifts of nature are so plentiful, that those which are continually used never fail. She distributes her riches throughout the earth, and diversifies them in different countries, taking from some, and giving to others; by means of commerce such relations and links are established between distant kingdoms, that her productions, passing through an infinite number of hands, are much increased in value by their extensive and continual circulation. Such, in the hands of God, are the inexhaustible riches of nature, for which we can never be too grateful.

OCTOBER VIII.

PETRIFACTIONS.

The transformation of different substances from the animal or vegetable into the mineral kingdom, is a peculiarity in natural his-

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tory well deserving of our attention. Petrifactions throw much light on the natural history of the earth.

The first thing worthy of remark in petrifactions is their external form, which clearly shows that they have once belonged to the vegetable or the animal kingdom. The petrifaction of animals is not unfrequent. Aquatic animals are found petrified; and it is not uncommon to meet with entire fishes in this state, the least scales of which are distinctly visible; and the multitude of shells and worms found in the bowels of the earth, apparently converted into stone, is very great; and there are besides many petrifactions of animals found, no similar species of which are at present known to exist. The petrifactions of marine substances are found in great abundance in various parts of the earth; on the summits of the loftiest mountains, at an elevation of several thousand feet above the surface of the sea; and others at a great depth in the earth. Various species of petrified plants are also met with in different strata of the earth; and often the impressions which they have made are only seen, the substances themselves being destroyed. In some places whole trees are found buried more or less deep in the earth, and converted into a stony substance; but such petrifactions do not appear to be of a very ancient date.

It may with propriety be asked, how these petrified substances got into the earth, and particularly how they could be found on the highest mountains? And how animals, which generally live in the sea, and do not belong to our climate, have been transported so far from their natural abode? To explain this phenomenon many causes may be assigned. These petrifactions may be regarded as a certain proof that water once covered the greatest part of the earth; and as, wherever we dig, whether on the tops of the mountains, or in deepest mines in the earth, we find all kinds of marine productions, it would seem as if no more satisfactory explanation could be given. The great quantity of petrified shellfish found often in very high situations, and forming regular strata, gives us reason to believe that these heights once made a part of the bottom of the sea; and it is the more probable, because we know the bed of the ocean resembles the solid earth. We are yet very imperfectly acquainted with the manner in which nature effects these petrifactions. It is certain that bodies will not petrify in the open air, because animal and vegetable substances are dissolved or become putrid in that element; so that air must be wholly or partially excluded from the places where the process of petrifaction is going on. A dry soil has no petrifying property. Running waters may encrust some bodies, but cannot change them into stone; the very stream of the water would prevent it. A soft moist earth, containing calcareous matter in a state of solution, most probably contributes to petrifaction; the fluid penetrates into the pores of vegetable and animal substances, and as they dissolve deposits calcareous matter, which unites with, and adapts itself to, the substance in question. From the above account we may deduce some consequences which throw considerable light upon the subject. All animals and vegetables

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are not equally proper to be converted into stone; for that purpose they should possess a certain hardness of texture, which would prevent their becoming putrid, before they became petrified. Petrifactions are chiefly formed in the interior of the earth, and the place where they are formed should be neither very wet nor very dry. All the kinds of stones which contain petrifactions, or form the substance of them, are the work of time, and are still daily producing. Such are the calcareous and argillaceous earths, and several others of a similar nature; and petrified bodies partake of the nature of these stones.

Though petrifactions were of no other use than to throw some light upon the natural history of our globe, they would, on that account alone, highly merit our attention. But if we consider them as proofs of the secret operations and changes of nature, they will be very useful by manifesting the wonderful power and wisdom of God.

OCTOBER IX.

THE OPERATIONS OF NATURE ARE GRADUAL.

We may observe an admirable gradation, an insensible progress, from the simplest to the most complex perfection throughout nature; and there is no intermediate space which has not some characteristic of what precedes and of what follows; there is neither a void nor a break in the whole of nature.

Earthy particles form the chief composition of solid bodies, and are found in all substances decomposed by human art. From the union of earth with salts, oils, and sulphurs, &c. result different combinations of earths more or less compound, light, or compact. These insensibly lead us to the mineral kingdom. The different species of stones are very numerous, and their figure, colour, size, and hardness are very different. We find among them various metallic and saline matters, from which minerals and precious stones are produced. In the class of stones, some are fibrous, and have laminæ, or a sort of leaves, as slate, talc, litophytes, or stony marine plants, and the amianthus, or stony flower of mines; and these lead us from the mineral to the vegetable kingdom. The plant which seems to be the lowest in the scale of vegetation is the truffle, and next to it are the numerous species of mushrooms and mosses. All these plants are imperfect, and properly only constitute the limits of the vegetable kingdom. The most perfect plants naturally divide themselves into three great families, which are distributed over all the earth; these are herbs, trees, and shrubs.

The polypus seems to partake both of the vegetable and animal kingdom, and forms the connecting link between plants and animals.

Worms commence the animal kingdom, and lead us to insects; those which are enclosed in a stony or scaly shell seem to unite

insects to shellfish. Between these, or rather next to them, is the class of reptiles, which by means of the water-snake are united to fish. The flying-fish leads us to birds. The ostrich, whose feet nearly resemble those of a goat, and which runs rather than flies, seems to link birds with quadrupeds. The ape appears to be between man and quadrupeds. There are gradations in human nature as in all other things; between the most perfect man and the ape the number of links is very great. And how many must there be between the most perfect man and the lowest angel! How many between the archangels and the Creator of all things! Here new links, new designs, new beauties and excellences, are perceptible; but in the spiritual world these gradations are concealed by an impenetrable veil. However, we have the consolation of understanding from Revelation, that the immense space between God and the cherubim is filled by Christ, who is God manifested in the flesh. By him human nature is glorified and exalted; by him man is elevated to the first rank of created beings, and is permitted even to approach the throne of the immortal God.

The little which we have said respecting these different links of nature suffices to show us that every thing in the universe is blended, that all holds together, and is united by the most intimate bonds. There is nothing without design, nothing which is not the immediate effect of some preceding cause, or which does not determine the existence of something that is to follow. Nature does not proceed by starts; every thing goes on gradually from the least to the most perfect, from the nearest to the most distant, from bodily perfection to mental excellence. But our knowledge of this immense chain of beings is still very imperfect; we are yet acquainted with very few of the links. However, defective as is our intelligence in this respect, it is ample enough to give us the most exalted ideas of that admirable series, and infinite diversity of beings, which compose the universe; and thus we are led to that Infinite Being, between whom and us the distance is immeasurable.

OCTOBER X.

FALL OF LEAVES.

The ravages which the approach of winter makes in the forests and in the gardens begin to be now perceived. All plants, with the exception of a very few, lose their most beautiful ornaments, the leaves. What is the cause of this change! The most natural seems to be the cold; for as soon as the first frost sets in, the leaves begin to fall, and the vegetables to lose their verdant hue. This is owing to the circulation of the sap being checked by the cold. But this is not the only cause of the fall of leaves, for it takes place in mild winters when there is no frost, and in those trees which are preserved from the

effects of the cold in greenhouses. Other causes are therefore instrumental in stripping the trees of their leaves. Perhaps they wither because their transpiration is not supplied by the necessary quantity of sap from the root, for it is certain that the branches increase in thickness after they have ceased to grow in length. When, therefore, at the time that the branches still daily grow, the stalks of the leaves do not increase, their fibres must necessarily be detached from the fibres of the branches, and consequently the leaves will then fall.

But we must not suppose that these fallen leaves are entirely lost, and no longer useful: both reason and experience inform us to the contrary. Nothing perishes, nothing is useless in the world, consequently the leaves which fall from trees and plants are of some use; they grow putrid, and become manure for the earth; snow and rain separate the saline particles from them, and convey them to the roots of trees; and when the leaves are thus strewed on the ground, they preserve the roots of young plants, form a shelter to seeds, and retain round them the necessary degree of heat and humidity. This is particularly remarkable in oak leaves: they furnish an excellent manure, not only to the tree itself, but also to the tender shoots; and they are particularly useful to pastures, by promoting the growth of the grass which they cover. These advantages are so important, that fallen leaves are never collected for the purpose of throwing them away, unless they are in such abundance, that the grass is rather choked up than nourished by them.

Leaves may serve as manure in various ways; they are laid in stables instead of straw, and thus make a very good litter for cattle; or they may be mixed with other kinds of manure. The mould they produce is particularly useful in gardens, where beds are made of it, which contribute much to the growth of fruits and young trees.

The fall of the leaf, in a moral point of view, may be considered as an emblem of human life, and the frailty of all earthly things. 'I am as a falling leaf; death walks by my side; perhaps to-day I shall wither, and to-morrow be converted into dust! My life hangs by a thread, and I may lose all my beauty and vigour in a single moment. But if I leave behind the well-matured fruits of love, righteousness, and holiness, I shall quit this world with honour, and joyfully prepare to meet my Creator and Judge!'

OCTOBER XI.

DIFFERENT SPECIES OF EARTHS.

We can only form conjectures respecting the interior of the earth. Those who labour in the mines have not been able to descend lower than nine hundred feet; for if they wished to penetrate deeper, the great pressure of the air would be fatal to them, even if they preserved themselves from the water, which increases in proportion to the

descent. But what is this depth in comparison of the semidiameter of the earth? The interior of the earth must then necessarily be in a great measure unknown to us; for miners themselves have scarcely penetrated through the first crust. All that we know is, that when we have dug to the depth of some hundred feet, this crust is composed of different beds placed one above the other. These strata are much blended, and their direction, substance, thickness, and relative position, vary considerably in different places. Under common earth in gardens, clay and fat earth are generally found, and these are alternated by layers of sand, clay, and marl.

The division, then, of these different layers is quite arbitrary, and they may be more or less extended; but in comparing them together, that division seems to be most convenient which refers them to seven classes.

First, black earth, which is composed of putrid animal and vegetable substances: it contains many salts and inflammable matters, and is properly dung. Second, clay, which is more compact than black earth, and retains water longer upon its surface. Third, sandy earth, which is hard, light, and dry, and neither retains water nor is dissolved in it. It is the poorest of all earths, though some plants will grow in it. Fourth, marl, which is softer, more mealy, and more readily attracts moisture. Fifth, bog, or marshy earth, which contains a vitriolic salt, too acid for plants. Sixth, chalk, which is dry, hard, and calcareous; yet some plants thrive in it. And, lastly, stony earth. The smoothest stones, however bare of earth, are yet covered with moss, which is a production of the vegetable kingdom; and birch will grow to a considerable height between stones, and in the clefts of rocks.

The different species of earths of which these strata are composed are disposed with much wisdom; for only to mention the principal advantages which result from them, these different layers of sand, of gravel, and of light earth, favour the passage of fresh water, which filters through them, becomes softer, and is afterwards distributed to supply the wants of man and animals. These strata also form the reservoirs and canals of springs and fountains. And it is remarkable, that these canals are found in every country upon the surface of the earth, and that they are composed of a light earth, which is sometimes mixed with a soil which is harder and more stony, and tends better to purify the water. The diversity of earth is also very useful to the vegetable kingdom; for it is owing to this that herbs, plants, and trees grow spontaneously in certain countries, whilst in others they require the assistance of art. All that art can effect in such cases is to imitate nature, which has prepared for the plants which grow of themselves the soil, the nutritive juices, and the degree of heat most favourable to vegetation. This variety of soils is the reason why some herbs and plants have their internal structure different from others of the same species. It often happens that some plants will thrive in the same soil in which others languish, and that the same fruits will taste differently in different countries. Plants whose

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roots are weak, small, and fibrous, and which have not much sap, ought to be planted in a light sandy soil, that the roots may extend without being impeded, that the rain may more easily penetrate, and where the roots may not meet with too many saline and oleaginous particles. It is said that lettuce, cauliflower, salads, &c. may be produced fit to eat in the space of forty-eight hours, if the seeds are previously steeped in brandy, and the soil in which they are sown is mixed with pigeon's dung and the powder of slacked lime. A certain preparation of the soil is undoubtedly necessary for vegetation.

All this should make us acknowledge the wisdom with which the Creator has disposed the earth for the better production of plants, and the happiness of his creatures. It is extremely unjust to complain of the sterility of particular soils, for the divine goodness has always taken care that those countries assigned to man for his abode, should produce as much as is necessary for his subsistence; and if some soils are found less fertile than others, the Creator has amply compensated the loss, by advantages much more considerable; or he has inspired man with an ardour which prompts him to exert more energy in their cultivation.

OCTOBER XII.

WINE.

Wine is the gift of the divine goodness, for which we cannot be too grateful. God has not only given us bread and abundance of aliments for our support, he has also graciously provided for our pleasures and enjoyment; and to render our life more comfortable, as well as to contribute to our health, he has created the vine.

No other beverage, natural or artificial, produces effects in the same degree as wine: it dissipates melancholy, and excites the most pleasurable sensations. Bread makes a man able to act, but wine renews his strength, impaired by too much fatigue, renders his labour pleasant, and gives life and energy to all his exertions. Spirituous liquors do not diffuse over the countenance that lively cheerful air, which wine used in moderation imparts.

Let us here reflect upon God, who has communicated such beneficial properties to the juice of a plant of humble birth and sterile soil. How much his divine goodness is manifested in the abundance and the variety of wines! The different sorts are very numerous, and vary in colour, smell, taste, quality, and duration; and each climate enjoys such wines as are best adapted to the nature and constitution of its inhabitants. But it is very lamentable to see how much this blessing is abused. Some legislators have interdicted its use, not from motives of improving the health and the morals of the people, but from false principles of economy, or absurd notions of fanaticism. To

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one or other of these causes must be attributed the prohibition of wine to his followers by Mahomet.

The adulteration of wine so generally practised, particularly when effected by such noxious ingredients as lime, white lead, litharge, &c. &c. is highly prejudicial, and often fatal in its consequences. What can be more cruel and horrible than, for the sake of emolument, to convert what it has pleased Providence, in his infinite mercy and condescension, to bestow upon us for our comfort and support, into an unwholesome and poisonous drink? Surely, hardened as is the heart of man, he might feel some remorse, some compunction, in thus destroying and counteracting the efficacy of one of the richest gifts of nature. A poor unfortunate wretch, diseased and distressed, applies to wine as to a choice remedy which will relieve his misery and solace his affliction: out of the small pittance earned by his daily labour he purchases a little portion, and hugs himself in the fond hope that his strength will now be recruited, and his pains mitigated; but the avarice of man has tainted the source, and poisoned the spring; the streams are no longer salubrious, and, instead of life-invigorating juice, a slow poison circulates through all his veins.

Wine, when pure and unadulterated, is a most valuable medicine, restores the vigour of the constitution, and imparts energy to the system; but the too frequent and liberal use of it is as hurtful as in moderation it is beneficial.

OCTOBER XIII.

MIGRATION OF BIRDS.

About this time of the year, many of the birds, which during the summer frequented our fields, woods, and gardens, leave our climate, and migrate into other countries. Very few pass the winter with us; the principal species of those which remain are the yellowhammer, the woodpecker, the crow, the raven, the sparrow, the wren, the partridge, thrush, and blackbird. Most of the rest leave us entirely, or conceal themselves in secure retreats. Their migration is very wonderful, and highly interesting.

Some species, without ever taking a high flight, or parting in company, steer towards the south, in quest of the seeds and fruits which they prefer; and soon return. Others, which are called birds of passage, collect together at certain seasons, and fly in large flocks to other climates. Some species are satisfied with passing from one country to another, attracted at certain times by the air and food; others cross the seas, and undertake astonishingly long voyages. The birds of passage most known are the quail, the swallow, the wild-duck, the plover, the snipe, and the crane. The quails, in spring, leave the heat of Africa for the milder temperature of Europe: they fly in flocks like clouds, and often through weariness fall into ships,

where they are readily taken. Swallows pursue a different method: many of them cross the sea, and many remain in Europe, concealing themselves in holes of the earth, or in marshes, fastening themselves together, claw against claw, and bill against bill. They pile themselves in heaps, in places which are unfrequented by men and beasts. Wild-ducks and cranes also, at the approach of winter, go to seek milder climates: they assemble together on a certain day, and leave the country in a flock, which is generally arranged in two lines united in a point, like two sides of a triangle; a single bird leading forms the point, and the rest follow in two lines more or less extended. The duck or crane which thus takes the lead cuts the air, and facilitates the passage of those which follow, whose beaks rest on the tails of those that precede. The leader holds his commission only a certain time, and wheels from the point to the rear, and whilst he rests is replaced by another. All birds of passage, however, do not fly in flocks; some of them travel quite alone, or only in company with their females and family; others unite in small bodies. They are not long in their passage; it is calculated that they can fly two hundred miles in six hours each day, provided that they repose the rest of the time, and during the night. According to this calculation, they can pass from our climate to the equinoctial line in seven or eight days; and this is confirmed, since swallows have been seen on the coasts of Senegal eight or nine days after their departure from Europe.

The migrations cannot be too much admired: no doubt the alternation of heat and cold, and want of nourishment, warn them to change their abode. But how is it, that when the temperature of the air is mild, and they can obtain food enough, they still go at the appointed time? How do they know that they will find nourishment and a due degree of heat in other countries? Why do they all migrate at the same time, as if they had before unanimously determined upon the precise day of their departure? And how, in the obscurity of night, and without knowing the country or the climate, do they pursue their course with uninterrupted perseverance? These, and many more questions of like nature, which may be asked upon this interesting subject, are perplexing, and cannot be explained in a satisfactory manner, because we do not know enough of the nature and instinct of these animals. We may, however, acknowledge in these migrations the wise beneficent directions of Providence. What means does not he employ to preserve and nourish certain species of birds? How tenderly and carefully he supplies their wants, when their food fails in some countries! Let us learn from this, that every thing in the vast empire of nature is arranged with the utmost wisdom. Instinct is to birds what reason is to man, and dictates to them all that is necessary for their preservation and support. How unfounded, then, is that uncertainty and distrust which makes us doubt the cares of Providence! The very flights of the birds should instruct us in our duty. Why do we so often abandon ourselves to discouragement, doubts, and fears? Will not that God who directs the birds in their

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distant voyages over the seas, also have as much love and regard for the beings whom he has vouchsafed, in his mercy, to endow with the noblest faculties and pre-eminence? And shall not man, appointed by the immediate word of God, sovereign of the creation, experience the tender cares and parental affection of his Creator? 'I will walk on my way with confidence; God is my leader, and I will not turn aside into crooked paths. He wills my happiness, and I cannot be miserable when conducted by so kind a Father.'

OCTOBER XIV.

VARIETY OF TREES.

The great diversity which is seen in all the productions of the vegetable kingdom may also be observed among trees. Some, as the oak, are remarkable for their strength and duration; others, as the elm and fir, are tall and slender; and others, as the thorn and box-tree, never attain any great height. Some are knotty, with a rough bark; whilst others are smooth and fine, as the maple, the poplar, and the birch. Some are used to adorn the apartments of the rich, whilst others are employed in common and necessary purposes. Some are so delicate, that the least wind overturns them; and others unmoved resist the violence of the northern blast. Some of them grow to an extraordinary height and thickness; and each year, for more than a century, has contributed to their size; others acquire their full growth in a very few years. Pliny admired those great trees out of whose bark they constructed boats capable of containing thirty people; what, then, would he have said of those trees of Congo, which, when hollowed, form boats which will hold two hundred persons? or of those trees which, according to the accounts of travellers, are eleven feet in diameter, and upon which they can carry from 40 to 50,000 lbs. weight? There is one of this kind in Malabar, which is said to be fifty feet in circumference. Such is the cocoa-tree: it is a species of palm, and the leaves of some of them are so large that they will cover twenty people. The tallipot, a tree which grows in the island of Ceylon, and in height resembles the mast of a ship, is also remarkable for its leaves, which are so large, that it is said one of them alone will shelter twenty men from the rain! they are so pliant when dry, that they may be folded up like fans, in which state they are extremely light, and not thicker than a man's arm. There are still to be seen on mount Lebanon twenty-three ancient cedars, which are said to be antediluvian. A naturalist who has seen them asserts, that ten men could not embrace one of those cedars; they must consequently be from thirty to thirty-six feet in circumference. The gum-trees in the American islands are generally twenty-six feet in circumference; from which we may conjecture, that the cedars of Lebanon are not so old as is reported, though it is well known that

many trees attain a very great age. There are apple-trees a thousand years old.

This great diversity of trees may remind us of the varieties which we find among men, as to their occupations in life, their talents, modes of thinking, and the services they perform. As there is no well-formed tree in the forest that is not of some use to its owner, so there is no person in society who may not be useful in the profession which he follows. One man resembles the oak in his firmness and unbending constancy; another compensates this want of strength by complaisance and address; he is all things to all men, flexible as the willow, bowing to every breath. The man of integrity will only comply with what is just and innocent; but he who regards with indifference laws human and divine, will always coincide with that party which is the strongest, without troubling himself which side is in the right.

However different trees are from each other, they all belong to the Governor of the universe, are nourished by the same earth, refreshed by the rains, and cheered by the same sun. Would to heaven that all men, whatever diversity there is among them, would unite to acknowledge that they are all alike the creatures of God, equally the subjects of his power, and the objects of his parental solicitude; that they owe to him all their nourishment and preservation, and to him are indebted for those faculties which distinguish them above all the creatures of the earth. The cedar rising majestically upon mount Lebanon, and the bramble creeping at its feet, are alike nourished by the juices of the earth and the rains of heaven. The divine protection is also as necessary to the rich as to the poor. Men, in the most elevated and exalted ranks of society, ought always to remember that it is to God they owe all their grandeur, that they only enjoy it through his permission, and that one moment may see them overturned from their lofty seats, and mingling with their native dust. Such thoughts as these would tend to repress those emotions of pride which are too apt to possess their hearts, and would inspire them with that submission and obedience, which is due to the Author and Conservator of their being.

OCTOBER XV.

TEMPERATURE IN DIFFERENT CLIMATES OF THE EARTH.

At first view it would appear that the temperature of countries depends upon their relative position to the sun, since his rays fall upon the places in the same degree of latitude in a similar manner. But experience teaches us that cold, heat, and all variations of temperature, depend upon many other circumstances. The seasons may be very different in places under the same parallel, and they are sometimes alike in very different climates. As then accidental causes may

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make the heat very different in the same latitude, and since it is not always such as from the distance of the sun we might expect, it is difficult to determine precisely the seasons and temperature of every country.

The vicinage of the sea renders the climate milder, of which England and the coasts of Norway are undoubted proofs. The sea may sometimes be frozen near the shore, when the influx of fresh water is great; but this does not take place at any great distance from land, both on account of the quantity of salt contained in the sea, and its continual agitation. Thus, the sea never being cooled down to the freezing point during the winter, the adjacent countries enjoy a milder temperature. The more a place is elevated above the surface of the sea, the greater is its degree of cold. The air is not only more rare, and colder, but the greatest part of the heat caused by the reflection of the sun's rays by the earth does not fall upon high hills, but remains in the plains, and in these the heat is always the greatest. Quito is almost under the line, but from its great elevation, the heat is very moderate; such countries have generally a light and serene air, and a pretty equal temperature.

High mountains attract the clouds; hence it happens, that, rain and storms are more frequent in mountainous countries than in other places; and it has been observed, that it seldom rains in the deserts of Arabia. Countries which abound in extensive forests are generally cold; the ice melts there more slowly during the winter, because the shade of the trees impedes the action of the sun's rays. The ice cools the superior portion of air, and thus retards the thaw.

In warm climates also the heat is rendered more temperate by the days there not being very long, and the sun not continuing a great while above the horizon. In colder countries the days in summer are very long, which occasions the heat to be greater. The serenity of the sky, the clear light of the moon, and the continuance of twilight, render long nights very supportable. In the torrid zone the seasons are not distinguished so much by summer and winter as by dry, moist, or rainy weather; for when it ought to be summer, or when the sun rises to its greatest height above the horizon, and his rays fall in the most direct manner possible, the rains set in, and continue for a longer or a shorter time. In these countries, the most pleasant season is that in which the sun is at his least elevation. In the countries beyond, the weather is more uncertain than in those within the tropics. In spring and autumn the winds are most prevalent. In winter the earth is frozen more or less deep, though seldom in our climate beyond three feet; in more northerly climates it freezes much deeper, and only thaws a few feet during the summer.

In all these arrangements the operation of admirable wisdom and goodness is manifest. In thus regulating the seasons, and the temperature of different countries, the Creator has rendered every part of the earth fit to be inhabited by living creatures. The inhabitants of the most remote regions enjoy as much felicity as is consistent with their nature; every country has advantages and disadvantages,

which so nearly balance each other, that it is difficult to determine which country deserves the preference; and there is no one place on the surface of the globe where the bounty of God is not manifested. From our climate to the most distant zones his goodness is every where displayed. All the inhabitants of the universe experience his paternal love. None of his creatures are forgotten. All that breathe derive from him life, nourishment, joy, and happiness.

OCTOBER XVI.

ATMOSPHERE OF THE EARTH.

The air with which the earth is surrounded is not so pure and subtile as the ether, being impregnated with a multitude of particles and exhalations which are continually detached from the earth and the waters. The air thus blended forms the atmosphere. Its inferior region, or that which is next the earth, is compressed by the superior stratum of air, and is consequently more dense. The proof of this is ascertained by those people who ascend high mountains: their respiration becomes more painful and difficult in proportion to their ascent. It is impossible to determine the exact height of the atmosphere, because we cannot ascend very high in the air; neither can it be inferred with certainty, from the duration of twilight, how far the mass of air extends. Granting that the morning twilight begins and that of the evening terminates when the sun is eighteen degrees below the horizon, and that the latter twilight is produced by the rays which strike upon the earth and are reflected by the most elevated parts of the atmosphere, many difficulties will yet remain to be explained. However this may be, the atmosphere is divided into three regions. The lower region extends from the earth to that place where the air is no longer heated by the rays reflected from the earth. This region is the warmest. The middle region begins where the preceding one terminates, and reaches to the summit of the highest mountains, or even to the most elevated clouds, and is the place where rain, hail, and snow are formed. This region is much colder than the lower one, for it is only warmed by the rays which pass directly through it. The third region is still colder, and extends from the middle one to the utmost limits of the atmosphere; these boundaries, however, are not exactly ascertained.

The particles which rise from the earth into the atmosphere are of different kinds; there are aqueous, earthy, metallic, and sulphurous particles, with many others. As some of these are more abundant in certain districts than in others, there results a great diversity in the air, and the difference is evident even at a small elevation. Heavy air is more favourable to the health than that which is light. When the air is dense it is commonly serene, whilst a light air is generally accompanied with clouds, rain, or snow.

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An air too dry is very injurious to the human body; but this is seldom experienced, except in sandy countries. A very moist air is equally unwholesome, by relaxing the system, and impeding the insensible perspiration. When the air is very hot, great languor and debility are produced, with copious perspiration; and when it is very cold, rigidity, obstructions, and inflammations, are the consequences. The most salubrious air is that which is in a just medium between all these extremes.

It is in the atmosphere that clouds, rain, snow, hail, dew, thunder, and various meteors are engendered. To the atmosphere we owe the morning and evening twilight; as the rays of light are refracted and reflected, and bent in different directions in this volume of air, we see them before the sun rises, and enjoy them some time after he is set. Hence those people who live under the polar circles enjoy during the winter some rays of light, even while the sun is yet below the horizon. The atmosphere is the habitation of the winds, which have so much influence upon the fertility of the earth and the health of man. If the air was to be in a state of uninterrupted serenity, cities and provinces would soon be deprived of their inhabitants, and exchange their gayety for the dreariness of a desert; if occasional storms and tempests did not sometimes rage, and by their ebullitions agitate the calm air, the whole world would become one vast sepulchre, in which every living creature would moulder into annihilation.

What great reason, then, have we to bless and to adore our heavenly Father for this happy arrangement of nature; and to acknowledge with awe and reverence that wisdom which has regulated and directed the vast machinery of the universe, for the greatest possible felicity of every being which enjoys life, reason, or instinct!

OCTOBER XVII.

PROPORTION BETWEEN BIRTHS AND DEATHS.

That God has not abandoned to blind chance the lives of men and the preservation of the human race, but that he watches over them with paternal care, is evident from the exact proportion in which, in all ages and countries, men enter and quit the stage of existence; so that the earth is neither destitute nor too full of inhabitants.

The number of births generally exceeds that of deaths; for it has been calculated that if ten persons die annually, twelve or thirteen are born. Thus the human race is continually multiplying. If this was not to be the case, and the proportion of deaths exceeded that of births, a country would be depopulated in a few centuries, particularly as the population of a country may be affected by various accidents. The principal obstacles to the increase of the human species are war, pestilence, and famine, celibacy, and crowded cities, where at least as many people die as are born.

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Baptismal registers prove that more males than females are born, the proportion being nearly twenty-one to twenty; but war, death, and various accidents to which men are exposed, preserve an equality between the sexes: in towns females are even more numerous, but in the country the males preponderate.

The number of children relatively to that of families is also regulated with the greatest wisdom. In sixty-six families it is computed that only ten children are annually baptized. Out of fifty or fifty-four persons in a populous country only one marries each year, and each marriage, taking one with another, produces four children; but in large towns only thirty-five children are reckoned to ten marriages. Men capable of bearing arms generally constitute the fourth part of the inhabitants of a country.

By comparing the bills of mortality of different countries, it is found, that in those years which are not remarkable for any destructive disorder, such as an epidemic, there dies in villages, out of forty people, one; in small towns, one out of thirty-two; in middling-sized towns one in twenty-eight; in very populous towns or cities, one in twenty-four; and in a whole province, one out of thirty-six. Out of a thousand people twenty-eight annually die. Of a hundred children that yearly die, three are always stillborn; but scarcely one in two hundred dies in the birth. Of the hundred and fifteen women who die, only one dies in childbed; and out of four hundred deaths, only one happens in labour.

The greatest mortality among children is within the first year; out of a thousand infants, two hundred and ninety-three die before they have obtained a year's growth; but between the first and second year of their age, only eighty out of a thousand die; and in the thirteenth, fourteenth, and fifteenth year, the number of deaths is so small as not to exceed two in a thousand. This, then, is the period of life in which there is least danger. It has been observed, that more women than men have attained to the age of from seventy to ninety years; but that more men than women pass their ninetieth year, and reach a hundred. At least three thousand millions of people may live at the same time upon the earth; but there is scarcely one third of that number, or, at the most, one thousand and eighty millions: of these six hundred and fifty millions are in Asia, one hundred and fifty millions in Africa, one hundred and fifty in America, and one hundred and thirty millions in Europe.

The most natural inference to be drawn from all this is, that God has the most tender solicitude for the life of man, and that he regards it as being very precious; for if the divine wisdom had not operated, how could the proportion between births and deaths be so equally maintained, and so admirably preserved at all times and in all places?

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OCTOBER XVIII.

RAVAGES IN THE KINGDOM OF NATURE.

We now see that even beautiful nature, which in spring ravished our senses, and procured us so many diversified pleasures, is subjected to the law common to all created things. Its beauties begin to disappear, and every day brings new changes, each one more gloomy than the last. Such is the lot of nature, that it contains in itself the sources of the most afflicting devastations.

What ravages are occasioned by the overflowing of seas and rivers, heavy rains, and the melting of ice and snow! Whole villages inundated, fruit-trees torn up, corn-fields desolated, and flocks destroyed, present to us the sad monuments of the destructive force of the elements. A shipwreck appears to be a less fatal catastrophe! yet some new commonwealth might have been formed by the men thus entombed in the deep; and immense sums, the collection of ages, are lost in a moment. Whole families are ruined by a shipwreck. The aspect of the ocean perturbed by a storm, its billows swelling with rage, and white with foam; the piercing cries of the fear-struck mariners, and the crash of the vessel against some hidden rock, are dreadfully terrific!

The calamities occasioned by a long drought and intense heat are also very great. Herbs and plants languish, the earth is dried up, and we are nearly stifled with burning dust. The waters become putrid, and form a fatal drink for the drooping herds. Heat and putrefaction prodigiously multiply insects, which destroy every thing, eat up the produce of the fields, and if they die to-day, revive to-morrow in new generations. Famine, that terrible precursor of death, marches with hasty strides, and pestilence speedily follows. One year's barrenness, a war, or a contagious disease, may occasion all these evils.

What terrible chasms and ravages are occasioned by an earthquake! Far within the bowels of the earth, the pestilential vapours are extricated by a destructive fire, which carries with it death and dismay. Suddenly, and often at the dead of night, when nature is wrapt in sleep, the earth bellows and shakes, opens, and swallows up thousands of people, who are thus summoned, without time for repentance, before the throne of the Almighty! At the awful spectacle of nature, convulsed by earthquakes and volcanoes, we may justly say, how imperfect is every thing but the Creator himself! Many people pay that adoration to nature which they owe to God, and forget that it is he who gives every beauty and pleasure which we enjoy in nature. Let us learn the true condition of all terrestrial things, and acknowledge the advantages that the love of God has over every thing to which our hearts can be attached. To experience delight in the contemplation of his august attributes, to enjoy a portion of his grace, and to feel that he is our sovereign good, is to triumph over all the desolations of nature. What can be more proper to increase our love and

our gratitude for him than to call to mind those calamities, which his wisdom converts into blessings? These apparent deracinations of nature prevent much more fatal evils, which would certainly take place, if the destructive matters, fires, and vapours, were to remain enclosed in the bowels of the earth. Volcanoes and inundations often present to us the most terrible calamities: burning heats consume the earth in one place, whilst in another it is deluged with water. Pestilence and famine sweep off a number of wicked people from the earth; and the extraordinary mortality which sometimes prevails among men is a very wise means to preserve their number in due proportion, and to prevent their population being too great.

When we are merely spectators of the devastations which sometimes happen, and are not directly interested in them, our gratitude to the Supreme Being who has spared us should be marked by our sentiments of compassion and sympathy for the unfortunate sufferers. We should never be insensible to the misfortunes of our fellow-creatures, nor hear with indifference the recital of calamities, however remote are the people who suffered. In the immense chain of mundane events, there is not a single link with which we have not some connexion, more or less distant. Were the unfortunate people who have experienced so many disasters greater sinners than ourselves? Why are they fallen, whilst we yet remain? Are the regions we inhabit less contaminated by crimes than those countries where earthquakes and volcanoes make such extensive ravages? The final catastrophe of nature will be still more terrible to us. The world is not eternal; after having experienced a succession of every species of calamity, the period of its utter destruction will arrive. Nature now flourishes, but visibly grows older. It is only by force, industry, and labour, that we now obtain from her what she spontaneously produced to our ancestors, and what they gathered without trouble. Perish then, thou earth, the place of our pilgrimage, since to perish is thy destiny! We have here no continuing city; let us, therefore, seek and know the city which is to come, where lives the eternal God in the midst of the children of holiness.

How I mourn over you, ye cities and desolated villages! How my soul longs to fly to your assistance, to deliver you from bondage, and to divide my bread with your unfortunate inhabitants? Humble yourselves, ye afflicted, under the mighty arm of God, and bear with patience the trials to which he subjects you. Remember your brethren who have experienced similar misfortunes. They who have been your companions in misfortune have now their wounds healed, and their burned houses changed into palaces.

To destroy and to create is, and will be, to the end of time, the prerogative of God. If he never destroyed, we should not behold new creatures; we should not have occasion for acts of resignation and patience; we should not sufficiently feel the value of that religion which strengthens us in prosperity, consoles us in adversity, and makes us superior to misfortune.

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OCTOBER XIX.

CIRCULATION OF THE BLOOD.

Of all the changes which take place in the animal body, none are more important and mysterious than the circulation of the blood. There is in this motion a striking grandeur, which makes us feel the limits of the human understanding, and inspires us with a profound admiration for the supreme intelligence of our Creator.

The blood continually circulates in our bodies: the heart, which is the principal organ of circulation, is placed within the breast, between the two lobes of the lungs; it is a fleshy substance, and has two cavities, which are separated from each other by a valve. The heart is in continual motion, alternately contracting and dilating. From the left ventricle a large artery called the aorta, proceeds, and soon divides into several branches, which ascend and descend by innumerable ramifications, become smaller as they proceed, and penetrate every part of the body. When the right ventricle contracts, the blood is propelled into the arteries with so much force, that it reaches the minutest extremities of their most remote ramifications. This motion is called the pulse, which is merely the effect of the pulsation of the heart, and is quicker or slower according to the frequency of its contractions. When the blood arrives at the extremities of the arteries distributed through the body, nature employs it in the wisest manner. Certain vessels absorb the watery, oily, and saline parts. In some parts of the body, where the arteries are distributed, the secretion of milk, fat, and various fluids is performed. The remaining portion of blood flows into the extremities of the veins, in a manner that, with the aid of a microscope, we can very distinctly perceive; the red globules rolling one after another. These vessels gradually enlarge in size till they form very large tubes, which return the blood back to the right ventricle of the heart.

The blood is then propelled into the pulmonary artery, which disperses it through the lungs by innumerable small branches. It is there exposed to the action of the air, is afterward received by the pulmonary veins, and by them is conveyed to the left auricle of the heart. This contracts and sends it into the left ventricle, which also contracting, pushes it into the aorta, whence it circulates through every part of the body.

Such is the admirable circulation of the blood in man and most animals. But there is still much obscurity in this interesting subject. We meet with wonders here, that prove how incapable the human mind is of explaining this work of divine wisdom. How wonderful it is that the motion of the heart continues uninterruptedly for seventy, eighty, or even a hundred years, without that delicate organ decaying, or being out of place! The circulation of the blood is performed twenty-four times every hour: consequently, in twenty-four hours, this operation is performed five hundred and seventy-six times; and,

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as at each pulsation the heart propels two ounces of blood into the aorta, it will be found that in the space of an hour, there passes through the heart six hundred pounds of blood. This alone is sufficient to excite our astonishment; but how many wonderful things besides take place in the circulation of the blood, of which we have very imperfect ideas? In short, man, whose dominion over the world every thing acknowledges, is a marvellous piece of workmanship. The most admirable mechanism and corporeal beauty are united in him; each of his members declares that he is lord of the creation. An innumerable multitude of invisible tubes, fashioned and arranged in a manner that infinitely surpasses human art and human wisdom, conduct, and every where throughout the body distribute, and uninterruptedly circulate, the precious life-sustaining fluid. In this universal motion, this continual ebbing and flowing, every thing is regular and admirably directed; every thing is in its place in the most perfect harmony; nothing is discordant, nothing clashes, nothing impedes, and nothing precipitates its course.

The same admirable circulation that we observe in animals obtains throughout nature. The sun, the moon, and the stars, perform their appointed revolutions with a determinate and uniform motion. There is even a continual circulation in the elements; the air is not only in perpetual motion, since it never ceases to circulate round the earth, but water also continues its course without cessation. The rivers pour their streams into the sea, and from the vast surface of the ocean vapours arise which form clouds; these are precipitated in showers, which penetrating the mountains, form springs of water that insensibly increase till they swell into rivers, and again return to the parent ocean.

The earth, ever fertile, annually produces flowers and fruits, and yet is never exhausted, because the continual circulation of the nutritive juices repairs its losses, and restores to it again what it has given to us. All these revolutions of nature bring us to a first cause, which has so arranged the world, that all beings are continually in action, circulate, move, and act in an insensible labyrinth of changes, till they return to their original place, and commence again the course which was prescribed to them.

OCTOBER XX.

PROPORTION OF VARIOUS PARTS OF THE HUMAN BODY.

God has formed the human body according to the wisest rules, and he has established the most exact proportion even in the minutest parts. To be convinced of this, we have only to calculate the height and the bulk of the human body from certain specific measures. The height of the body is generally divided into ten equal parts, which in technical language are called faces, because the human face was the

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first model of these measures. The first face comprehends the whole of the visage, beginning at the root of the hair on the forehead; from which point to the summit of the head there is still one-third of the face in height, or what is the same thing, a space equal to the length of the nose; so that, from the crown of the head to the point of the chin, there is the length of one face and a third. Between the bottom of the chin and the hollow of the clavicles, just above the breast, there is two-thirds of a face: thus the length from above the breast to the crown of the head is twice that of the face, which is the fifth part of the whole length of the body. From the hollow between the collar-bones to the bottom of the breast is reckoned one face. Below the breast begins the fourth face, which ends at the navel; and the fifth extends to the pubis, which makes altogether half the length of the body. Two faces are reckoned from the beginning of the thigh to the knee, which last makes half a face. There are two faces in the length of the leg, from below the knee to the instep, which in the whole makes nine faces and a half; and from the instep to the sole of the foot there is half a face, which completes the ten faces, into which the height of the human body has been divided.

This division has been made for men in general, but in those who are of greater stature than usual, about half a face more is found in that part of the body which is between the chest and the pubis; and it is the superior length in this place which constitutes a proper size.

When the arms are extended, so as to form a straight horizontal line, the distance between the extremities of the middle fingers of each hand is equal to the length of the whole body. From the hollow between the collar-bones to the joint that unites the shoulder-bone to the arm is one face length. When the arm depends all its length, it is computed at four faces; two between the shoulder and the extremity of the elbow, and two more from the elbow to the tip of the little finger, which makes five faces for each arm; consequently, the length of both equals that of the whole body. The hand is one face long; the thumb the third of a face, which is also the length of the great toe; the length of the sole of the foot is equal to a sixth part of the height of the whole body. The bulk of the body and of the limbs have also their measures. The thickness of the finger is generally the thirty-sixth part of its length; that of the little finger is the forty-eighth part; three times the thickness of the thumb gives that of the hand, and six times the thickness of the hand equals that of the whole body.

The height of the human body varies considerably. The most perfect stature is from five feet five to five feet nine inches: the middle size is from five feet and an inch to five feet four, and the little size is below five feet. Women are generally two or three inches shorter than men. Their breast is more prominent and elevated, so that generally the capacity of the chest formed by the ribs is deeper in women, and broader in men, in proportion to the rest of the body. The hips of women are much wider than those of men, the bones which form the pelvis being much larger.

Man has a greater proportion of brain than any animal of the same

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dimensions, even more than the horse or the ox. A man that weighs a hundred pounds has usually four pounds of brain. Infants born at their proper time generally weigh at the most eight pounds, and at the least five pounds; their greatest length is one foot eleven inches, and the least one foot six inches.

The human body considered as a whole, or in its parts separately, will appear to be formed in the exactest proportion. Every thing in it is regular, and arranged with the greatest harmony, both with respect to its size and figure; and the situation of the parts themselves, not one of which is greater or less than the connexions it has with the other parts, and the general utility of the machine, require. No form or situation can be imagined more suitable to each part, or more advantageous to the whole of the members. Though some varieties and irregularities may appear, such as monsters and deformed men, they do not at all destroy the principal design of the body. But if certain disproportions in the size, figure, and position of the parts be consonant with the great end for which the body was formed, they certainly diminish the beauty and elegance of the form, and the graces of the exterior. How grateful, then, ought well-formed persons to be, and those whose limbs are moulded in just and beautiful symmetry!

OCTOBER XXI.

NAVIGATION.

To reflecting minds, the subject of navigation may give rise to very important and pleasing meditations. At the same time that our curiosity is interested and gratified, we gain a new source of pleasure. We ought not only to regard navigation on account of the advantages which it procures us, but we ought also to regard the mechanical part and the motion of ships.

Is it not truly astonishing that so huge and heavy a mass as a ship can float upon the water? The weight of a ship is very great, and little attention is requisite to convince us that its pressure on the water must be prodigious. A man-of-war, whose complement of men is eight hundred, generally carries provisions enough to supply them with nourishment for the space of three months, and mounts from seventy to a hundred guns. Now allowing each man to weigh one hundred pounds weight, and each gun nine hundred, (though some weigh more than 4000 lbs.) and supposing that each man consumes only three pounds weight of provisions in the course of the day, this very moderate calculation will, however, make a totality of more than three hundred thousand pounds. Besides this, we should reckon the weight of the vessel itself, the rigging, and a great store of materials necessary to keep the ship in repair, and powder and ball for the guns; all which equal, if not exceed, the preceding amount.

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Yet this enormous mass, of upwards of six hundred thousand pounds weight, is put in motion by a gentle breeze. Does not this appear inconceivable, and contrary to the laws of nature? It is, however, perfectly natural, and should the contrary happen it would be very extraordinary. It is not altogether the wind that drives along this mass; the ship, with its whole cargo, swims in the water. But how does so heavy a body float? How can the water, whose particles do not adhere together, have force enough to support such a mass? It is the effect of a proper balance: the vessel sinks till the volume of water which it displaces is equal to it in bulk. Suppose the ship is one hundred and twenty feet long and fifteen broad, and that it sinks to the depth of two feet, that is, three thousand and six hundred feet of water, or so much cargo, since one takes the place of the other. Thus the river is not more burdened with the vessel than it was with the water which she displaced.

Formerly navigation was much more dangerous and laborious than it is at present. The most hardy sailors had not confidence sufficient to venture far out in the open sea, but confined themselves to coasting along the shore. Since the invention of the compass, they cross the seas with more certainty and security. Before this happy discovery, to make a short sea voyage was considered as very wonderful. In the time of Homer it required great preparation and frequent deliberation, before his heroes could determine upon crossing the Egean sea. The expedition of Jason and the Argonautes, to the island of Colchis, was regarded with wonder, as an exploit that would crown the achievers of it with immortal honour. But what were all these in comparison of our sea voyages? The compass enables us to perform the longest voyages: the magnetic needle, always turning towards the north, informs the navigator of the regions where he is, and of the countries to which he directs his course. In the gloom of night, in cloudy days, in the middle of the ocean, this instrument serves him as a guide, and leads him from one region of the globe to another.

The advantages of navigation are very great, and deserve our utmost gratitude: we are indebted to it for many of the necessaries of life. Without it we could not procure, or at least not without great difficulty, those spices and medicines which we receive from different countries. It would be extremely inconvenient to have all our necessaries brought by land. The following calculation will sufficiently prove this assertion. The freight of a ship is reckoned by tons, and many ships are of six hundred tons burden: now a ton is equal to two thousand pounds weight. Supposing it to be carried by land in wagons with four horses, and that each horse would draw one thousand weight, three hundred four-horse wagons would be required, with at least as many men, to transport this load. How dearly then should we purchase riches from distant parts of the world, and even some of the most necessary things of life! We ought also to regard navigation as a signal blessing, in being instrumental in the hands of God to the promulgation of the gospel of Christ in the most remote

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countries of the earth. And again, we whose lot is not that of daily braving the waves of the ocean, and exposing our lives to continual dangers, to obtain wealth or to procure the means of existence, ought to be very grateful to the Almighty; and whilst secure from such perilous encounters, living calmly in the bosom of our families, we ought to offer up to heaven our prayers for those who are obliged to traverse the ocean, and undertake distant voayges, whether for their private emolument or for the public good.

OCTOBER XXII.

BEASTS OF BURDEN.

Animals of this description do us so much service, and are so extremely useful, that they well deserve a particular investigation. We are generally satisfied with making them subservient to our necessities, either in supplying us with food, or assisting us in our labours with their strength; while, through ignorance or indolence, we neglect to consider the connexion they have with the whole creation, and to reflect upon the wisdom and goodness of the Creator, manifested in the production of these useful animals.

Of all domestic creatures, the horse is the most serviceable and tractable. He suffers himself to be employed in cultivating the earth, he carries for us all that we want, he submits with docility to all kinds of labour, and shares with us the pleasures of the chase, and the dangers of war, while he is content with a moderate and frugal supply of food. He gives up his own being to exist only by the will of another; he even anticipates the commands of his master, which he executes with wonderful promptitude and precision; he refuses nothing, exerts all his strength, and sometimes dies in the act of obedience. Nature has given him a disposition to love and to fear man, with a sensibility alive to the caresses which sweeten his slavery. The horse excels all other animals in fineness of figure and beauty of proportion. The elegant symmetry of his shape, and well-formed limbs; the outline of his head and neck, give him a quick and lively appearance, admirably contrasted by the boldness of his chest; his carriage is noble, his march firm and majestic; and when roused to action, every limb denotes his power and energy, every muscle shows his activity, and his defiance of danger is expressed by the fire of his eye and the thunder of his nostrils.

The ox is far from having the graceful elegance of the horse; his large head, his legs too thin and short in proportion to the bulk of his body, the smallness of his ears, his stupid look, and heavy pace, would seem to be imperfections; but he amply compensates his want of beauty by the important services which he renders to man. He is so strong that he readily carries very heavy burdens, and is satisfied with mean fare. Every part of this animal is useful; his blood, his hide,

his hoofs, his flesh, and his horns, &c. are all employed for different purposes. His very dung is a most excellent manure for the earth. In this animal the organs of digestion are very remarkable: he has four stomachs, the first of which will contain forty or fifty pounds weight of food; the third stomach has eighty-eight folds, which assist the process of digestion: whilst the stomach of sheep and goats has only thirty-six.

The ass, however despised and unprepossessing his external appearance may be, has nevertheless some very excellent qualities, and is of great use. He is not impetuous and fiery, like the horse, but quiet, simple, and well tempered. He has no haughtiness, goes peaceably on his way, and bears his burden without noise or murmur; he is temperate both in the quantity and in the quality of his food, being contented with thistles and the commonest herbs; he is patient, vigorous, indefatigable, and renders his master the most important and constant services.

How can we daily use these animals, and not at the same time think upon our Creator, who has formed them, and given them properties by means of which they become so useful to us? It is worthy the attention of a reflecting mind to know that the number of beasts of burden is much greater than that of wild beasts. Can we, without emotions of gratitude, reflect upon the goodness of God, which has given us supreme dominion over these creatures, the ability of taming them, and converting them to the most useful purposes, and the power of enforcing their obedience? This command over animals is one of those gifts of God by which man may every moment feel the excellence and superiority of his being. Since, then, it is to the Almighty himself that we owe this power and dominion, how extremely unjust it would be to abuse it by our ill treatment of these creatures, whether in overworking them, or in any other way treating them harshly.

OCTOBER XXIII.

WINTER SEED-TIME.

A great part of the food intended for the use of man and other animals is at this time committed to the earth; and when the farmer has sown his winter's corn, he begins to enjoy some repose. He will soon have the gratification of seeing his fields spread over with a beautiful verdure, giving promise of a plentiful harvest. Nature is secretly working whilst the germ is unfolding; her operations may be discovered by extracting from the earth some of the grains which are beginning to germinate. Two days after a seed has been sown, the juices which make it swell are conveyed to the germ, and cause it to sprout. The germ is always placed at one of the extremities of the seed; and that part of the germ which is nearest the outside becomes the radical of the future plant, while that part which is

towards the interior of the substance of the seed becomes the stem, and the head of the plant. Twenty-four hours after the corn has been sown, the germ, which begins to pierce the coat of the grain, and to disengage itself, puts forth its root and stalk; the root is at first enveloped in a sheath, which it bursts. In a few days other roots shoot out at the sides, having extricated themselves from the sheath. By the fifth or sixth day the corn begins to appear with a small green point above the ground; it remains a considerable time in this state, till, as the season advances, and fine weather favours, the ear bursts from its coats, which hitherto had sheltered it from all the variations of temperature.

From this consideration, we may with propriety proceed to reflect upon the nature of human life. Our present existence may be regarded as the germ of a future life, and our state here as that of our seed-time, when we can discover very little growth. The luxuriant ear, the ripe sheaves, and mature fruit, we cannot yet see, neither is the harvest to be reaped upon the earth. We live in hope. The husbandman having sown his field, abandons his seed to corruption, to rain, to storms, and to the sun's heat, and does not yet know what will be the result: so does it happen with regard to spiritual seed. Let us not exult in what we sow, nor be cast down if we do not immediately see the fruits; neither let us ever be weary with sowing to the Spirit; and perhaps our good works, however small, may hereafter have the most beneficial consequences. Now that our ground is sowed, let us patiently, and without anxiety, wait till we gather the fruits of our labour, and, like the pious husbandman, let us pray unto God to crown our fields with his blessings.

OCTOBER XXIV.

PARTICULAR PROVIDENCE.

It would be very unfortunate for the world if there was any foundation in that principle of the incredulous, that God is only concerned for the totality of beings, and the preservation of society at large, but has no care of particular individuals. The absurdity of such an opinion is evident. Both the dictates of reason and the sentiments of religion teach us to believe in a God, whose providence extends itself to every creature in particular, and to every part of which that creature is composed. Let it not be imagined that it is beneath God to regard individuals. The whole universe, as well as the smallest particle of dust, is nothing in comparison of the Infinite Being. What, then, can we call little or contemptible? Is there not less distance between an individual, and a whole nation, than there is between them and the stars, which appear so small to the eyes of men? The least reflection suffices to convince us, that in comparison of that God to whom a million of years are no more than a day, and the whole

universe as a drop of water compared with the ocean, there is nothing which is in itself either great or little, nor any event, however inconsiderable it may be, that is unworthy of his attention. If we take the meanest plant, or the least insect that we can dissect, we shall discover, even in its least particles, the same wisdom which is displayed in the structure of the whole. The least fibre contributes as much to the perfection of the whole animal, or plant, as these do to the perfection of the whole species, and as the entire species does to the perfection of the universe. If, then, God has not disdained to form these creatures which appear so despicable, why should it be considered beneath him to preserve them? And if the parts were not complete, how could the whole be perfect? or how could the whole species be preserved, unless that preservation extended to individuals?

Reason teaches us this, and revelation completes our conviction. It informs us that the very hairs of our head are numbered. Thus, the meanest part of our body, one of those hairs, thousands of which in the course of our lives we lose without perceiving it, or suffering any inconvenience, even these are numbered. Hence our Saviour drew this inference, that with much greater reason God interests himself on our account, and condescends to favour us with his regard; and this is the more evident, inasmuch as all men have been redeemed by the blood of his well-beloved Son, and have gained new favour in the sight of God by becoming the disciples of the blessed Jesus. O Eternal Providence! I adore thee in Jesus Christ. With the liveliest emotions of gratitude, I adore and bless thee, O God! Before the foundation of the world thou designed my happiness, before my supplications could reach the throne of thy grace, or my grateful aspirations ascend to heaven! And is it possible that thou canst now forget me? No! thy only Son, the blessed Redeemer, has undertaken my salvation, and suffered even the most cruel torments on my behalf. Let us, then, not be staggered by the raillery of vain and wicked men. Let us confide in that God whom the infidel would persuade us takes no care of his creatures. Let us consider that we were not formed for this life only, but that we are to live in another world, where the wonders of God's grace and infinite power will be opened to us in all their beauty and splendour.

OCTOBER XXV.

DIVISION OF TIME.

Time is measured and divided according to the revolutions of the heavenly bodies, particularly those of the sun and moon. These two spheres have the greatest influence upon the state of man. The revolution of the moon serves only to mark the division of time upon our globe, while that of the sun is doubtless instrumental in regulating that division in all the planets which revolve round him.

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Day is that portion of time which the earth expends in revolving round its own axis. That space of time during which the sun is above the horizon is called the artificial day; it is the time of light, and is determined by the rising and the setting of the sun. The time of darkness, when the sun is below the horizon, is called night. Day and night taken together make the solar day, which is divided into twenty-four parts, called hours; and each hour is again divided into sixty equal parts, called minutes; each minute into sixty seconds; and each second into sixty thirds. This division of the day into hours, minutes, &c. is indicated by the movement of the shadow occasioned by the gnomon of a sundial, or by the hands of a clock. Well-constructed sundials constantly mark the true time of the sun; but other time-pieces, which require to be regulated by the mean time of the sun, are frequently out of repair. Most Europeans begin their day and their hours at midnight, from which they reckon twelve hours till noon, and twelve hours from that to the ensuing midnight. The Italians begin their day at sunset, from which to the following evening they reckon twenty-four hours. The Turks begin their day a quarter of an hour after sunset, from which they count twelve equal hours; and when they are elapsed, they reckon twelve more to the following evening. The Jews begin their day at sunset, from which they number twelve equal hours to sunrise, and as many from his rising to his setting; consequently, the hours of their day are longer or shorter than those of the night, in proportion as the day is longer or shorter than the night.

A week is the space of seven days. A solar month is the time which the sun takes up in passing through one sign of the zodiac; but these months do not begin and finish exactly when the sun enters into a new sign. The lunar month is the space of time which elapses between two new moons, that is, twenty-nine days, twelve hours and forty-four minutes.

The solar year comprises twelve solar months, or the time which the sun is in passing through the twelve signs of the zodiac; and this is generally reckoned to be three hundred and sixty-five days, five hours, forty-eight minutes, and fifty-seven seconds. These years are at present used by most of the people of Europe. The lunar year is that space of time which comprises twelve lunar months, or twelve revolutions of the moon round the earth. It is composed of three hundred and fifty-four days, eight hours, and forty-eight minutes. The Jews and the Turks use this year, and to make it correspond with the solar year, they often intercalate a whole month. Our common year begins ten or eleven days after the sun has entered the sign of Capricorn.

However trivial and unimportant these measurements and divisions of time may appear in themselves, they are still of great consequence in their application to the moral life of man. The hours, days, weeks, months, and years, which compose the period of our present existence, have been granted to us, that by the proper use of our faculties we might fulfil the end of our creation. How, then, do we employ

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this precious time? Minutes and seconds are trifles in our eyes, which do not deserve our attention; yet nothing is more certain than that he who makes light of minutes will be equally prodigal of his hours. Are we even more economical of longer periods? If from all the days that are allotted us we deduct those which have been entirely lost with respect to our immortal souls, how little of real and effective life will remain!

How distressing and humiliating is the reflection, that of the hundreds and thousands of hours which divine goodness has intrusted us with, to devote to the great and eternal interest of our souls, so many have been shamefully consumed in separating ourselves from God, the best and tenderest of Fathers! How many years are passed in idleness and in vice, in gratifying our passions and injuring our neighbours! How inconceivably quick the few moments that yet remain fly away! Hour after hour imperceptibly glide along, and are irrecoverably lost; and an hour is much to a man who can so easily calculate by hours the period of his real and effective life.

Teach us, O Lord, so to number our days, that we may apply our hearts unto wisdom; and that henceforth we may make a proper use of that time which thou mayest still condescend to grant us; that so we may gain a portion of grace through Christ, and assure unto ourselves a glorious and happy eternity.

OCTOBER XXVI.

THE END OF SUMMER.

The last rays of the summer sun now fall feebly on the earth; every thing is changed: that country which so lately bloomed in verdant beauty and blushing charms is becoming poor, withered, and barren. We no longer see the trees rich in blossom, nor the spring gay with verdure; the magnificence of summer, displayed in a thousand variations of colours, whose richness is relieved by the beautiful green of the meadows and waving groves, is no more: the purple view of the vine has faded, and the gilded ears no longer ornament the fields. The last leaves of the trees are falling; the pines, the elms, and the oaks, bend beneath the blasts of the fierce north wind; and the fields, which have lavished upon us so many gifts, are at length exhausted.

The sad changes must necessarily diminish our pleasures. When the earth has lost her verdure, gayety, and beauty; when the fields are swampy, and gloominess reigns, man is deprived of many of those delights that he receives through the medium of sight. When the earth is thus destitute, nothing is seen around but a rugged and uneven surface. The songs of the birds no longer rejoice our ears, and there is nothing that recalls to our minds that universal delight which we so lately shared with all animated beings. The melody of the

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birds yields to the murmuring of waters and the howling of the winds. The fragrance of the fields is gone, and the sense of feeling is pained by the impression of cold and humid air.

But in the midst of these gloomy prospects we have reason to acknowledge how faithfully nature fulfils the eternal law prescribed to her, of being useful at all times and seasons of the year. Though, at the approach of winter, the country is desolate, and stripped of its most beautiful ornaments, it still presents to a properly organized mind the image of happiness. We may say with gratitude, here we have seen the corn grow, and these dry fields clothed with abundant harvests; and though the orchards and gardens are now deserted, the remembrance of the presents which we have received from them inspires us with joy, though we are exposed to the influence of the north wind. The fruit-trees have shed their leaves, the grass of the meadows is withered, dark clouds gather in the sky, the rain falls in heavy showers, the roads are impaired, and walking is impracticable. The man who has no resources in himself murmurs at this change, but the philosopher contemplates it with satisfaction. The dry leaves and withered grass, moistened by the autumnal rain, form a rich manure to fertilize the land. This consideration, and the sweet expectation of spring, naturally ought to excite our gratitude for the tender cares of our Creator, and inspire us with a perfect confidence in him. Whilst the earth has lost its beauty and external charms, and is exposed to the murmurs of those it has nourished and delighted, it has commenced its labours anew, and is busily employed in secret working for the future good of the creation.

OCTOBER XXVII.

MAGNIFICENCE OF GOD DISPLAYED IN THE CREATION.

'God has manifested himself in the creation as a being infinitely wise.' There is no creature, however useless it may appear, which has not its particular destination; and all are formed in that way which is best adapted to answer the purposes of their existence. This is at least the case with all those with which we are acquainted, and by analogy we may conclude it is the same with those that we do not know. If we begin with the sun, and descend to the smallest plant, we shall be obliged to acknowledge that, to be properly adapted to the end for which they are designed, these creatures could not be formed otherwise; and that for the purpose they are to answer they have no defect. The least parts of every creature are evidently appropriate to its destination; they accomplish the functions prescribed to them by nature; and were any of its parts to be taken away, the whole animal would be imperfect, and unable to fulfil the end of its existence. How wonderful is that whole which results from the connexion and relation which all creatures have with each other! Each

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is in its place, each has its proper functions, and these are essential to the perfection of the whole; neither could any of them be wanting, or imperfect, without more or less disorder resulting.

If, then, we represent to ourselves the Being who has formed this innumerable multitude of creatures, animate and inanimate; who has not only designed each of them to fill up certain places in the creation, but who has also disposed and arranged all their parts in a manner the best adapted to their ends, without any thing superfluous, without any thing defective; who, by the inclination of an immense number of individuals, has altogether formed a whole, where the most perfect harmony reigns, shall we not be struck with admiration, and pronounce with reverential awe, 'O the depth of the wisdom and the knowledge of God!'

'God has manifested himself in the creation as a being infinitely wise.' He has every where diffused life and motion. How numerous are the animated beings his beneficent hand has produced! From the beginning of the world man has always laboured to become acquainted with the different beings that inhabit the earth, and to this day he continues to discover new species which were before unknown. Life is a blessing, even to the meanest worm that crawls on the earth: what pleasure, then, must the Almighty derive from doing good, since he has bestowed upon so many creatures the felicity of existence. But of what use would life be, if it was destroyed as soon as created? The Creator has taken care that every creature shall live long enough to fulfil the end of its creation. He has assigned to each the place it is to inhabit, and every individual is provided, immediately upon its entering the world, with all that is necessary to the preservation of its life. Many animals bring with them into the world the instinct and degree of industry necessary to enable them to obtain nourishment; others, as man, are at first supported and instructed by their parents; and the earth's fertility for the benefit of her inhabitants is inexhaustible! Nearly six thousand years have elapsed since she began to support the many millions of beings that live upon her productions; and though the world should endure twice six thousand years longer, it cannot be doubted that a sufficient supply of nutriment would still continue to be afforded to the generations yet to come.

With life, how many pleasures and delightful sensations has not the Creator granted to all animated beings, and especially to man? How magnificently he has adorned and beautified the world he has destined for our temporary habitation! what enjoyments he permits us to taste in social life! what tender, fond, and endearing ties! what affection and sweet emotions cheer our hearts! And can ingratitude to a Being thus merciful and beneficent ever debase the minds of men who are endowed with reason, and the faculty of knowing and loving the great Author of their existence? Forbid it, heaven; and let us acknowledge in joyful accents that the earth is full of the blessings of God, who manifests himself in the creation as a being of all power.

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This power, infinite as the universe, boundless as the heavens, plainly manifested in every creature, is more particularly perceptible in the extremes, in the greatest objects of nature, and in the least. What but an infinitely powerful Being, surpassing all human conception, could have formed the firmament, that immense extent, that boundless space in which such myriads of spheres continually, without interruption, roll their vast orbs? Who but himself could have so long preserved the vast fabric steady upon its foundations, as if to endure for ever, and yet sustaining a concatenation of motions varied as they are wonderful? Who else could have fashioned a body too brilliant for mortal eyes to behold, whose splendour is ever undiminished, and fix it at such an awful elevation in the heavens as at once to command the universe, and receive the homage of numerous worlds, which, ever circling round, derive their radiance from this vast luminary of day?

Could any thing short of infinite power impart motion to the earth, the moon, and the stars; prescribe limits to their course, and urge their revolutions in endless succession?

Are we desirous of considering the presence of divine power in the smallest objects, we shall find it equally manifest, incomprehensible, and wonderful, as in the grandest and most sublime. Examine the very dust that strews the earth; mingled with it are myriads of insects, thousands of which united would not make up the bulk of a single grain of sand; yet each of these has its limbs, organs, and senses; each has its instincts and sensations; and to each the love of life is dear, and the desire of preserving it ardent. View the grass of the fields, the blossoms of the trees; study well their structure, origin, and use, and you will every where throughout the vast extent of nature, discover wonders that are worthy of their heavenly Author, and capable of calling forth all the gratitude and veneration which a virtuous and noble mind can feel for a Being whose attributes fill the universe with glory.

OCTOBER XXVIII.

LAWS OF INERTIA.

Inertia is that power of resistance by which all bodies have a tendency to remain in the state in which they are. When a body is at rest it remains so, till some force is applied great enough to overcome its resistance; and when that is accomplished it continues in a state of motion, from the same law of inertia which operated when it was at rest; and it now resists as forcibly those bodies which would retard its progress, as it before resisted those which impelled it to move. By this means bodies move with regularity, and the laws of motion and percussion may be exactly determined.

If the heavenly bodies did not possess this power of resistance, they

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could not move with so much order and regularity, and they would always require a new moving power to preserve them in motion. From this it is evident that the universe is arranged and governed by divine wisdom. The removal of any part of this immense edifice would derange the whole. Of what use to us would be the regular structure of plants and of animals, with the admirable arrangement of the heavenly spheres, if none of these bodies were susceptible of motion? How simple is this law, and how wonderful are its effects! Such always are the works of God: the principles are beautifully simple, and the whole edifice is as admirable.

In contemplating the works of God, every spectator is not alike able to discover the fundamental laws upon which most of the phenomena depend; and, consequently, they are not equally able to perceive and acknowledge the wisdom which directs them. This knowledge is reserved for the attainment of the philosopher, whose labours are thus amply repaid by the pure and exhausted delight which they procure.

There seems to be a certain degree of inertia inherent in the mind, somewhat similar to that which obtains in matter. Those bodies that constantly move in the same manner, and towards the same points, acquire a tendency to persist in the same direction; and a human mind has a similar propensity for those actions which we have often repeated in the same manner. Hence the difficulty of overcoming acquired habits. We may make a most excellent use of this propensity of mind, by directing it to strengthen our habits of virtue. For this purpose we have only to repeat very often the same good actions, till we are as much accustomed to deeds of virtue as we before were to those of vice. This is the more important, because without virtue we can never retain a true and lasting tranquillity.

Whence proceeds those errors which we often commit in this respect? Why do we follow with unceasing perseverance, imaginary good, which in the end leads to destruction? Our hearts, seduced by that pride which is natural to them, and our minds, dazzled by the deceitful lustre of worldly objects, cause us very reluctantly to approach the paths of virtue. But let not the violence which we thus do to our inclinations and passions discourage us. The practisers of vice themselves are often obliged to restrain themselves in their mad career, and resist the impetuosity of their passions, in order to procure some temporal advantage, or to shun some particular evil; and this violence which they thus do themselves, in resisting their sensual desires and gratifications, must be very painful and severe to men corrupted by effeminacy and enervated by dissipation. On the contrary, what sweet emotions cheer the heart when the soul retains her command over the senses, and preserves them in that subordination which is consistent with the dignity of beings endowed with reason! By frequently exercising this command we at length attain that happy state, where the soul, elevated above the turbulent region of the passions, looks down with compassion upon the deluded votaries of vice, and pities the miserable victims devoted to her chains.

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OCTOBER XXIX.

WANTS OF MEN.

No creature upon the earth has so many wants as man. He comes into the world naked, destitute, and ignorant. Nature has not endued him with that industry and instinct which most of the brute creation enjoy as soon as born; she has only given him the capability of acquiring reason and knowledge. In some respects, therefore, the animals may seem to be more favoured. They are extremely happy in having no need of clothes, instruments, and those conveniences so necessary to man; and in not being obliged to exercise that variety of arts and occupations, without which we cannot procure what our necessities demand. They possess at their birth, clothing, weapons, and every thing they require; or, if they require any thing more, they can easily procure it by means of their instinct, which they have only to follow blindly. If they want habitations, they know instinctively how to construct them. Do they require beds, covering, or clothes, they possess the art of spinning or weaving them; and they can change their old garments for new. If they have enemies, they are provided with natural arms for their defence; and are they ill or wounded, they know how to find remedies; whilst we, who are so much superior to all other animals, have more wants, and fewer means of satisfying them.

Perhaps it will be asked, why the Creator has thus given to man less natural advantages than he has to brutes? and such a question undoubtedly is excusable, if not expressed from motives of dissatisfaction or murmuring. The divine wisdom is equally manifested in this as in all other things. In subjecting man to more wants, God designed that he should continually exercise that ratiocinative faculty, which is given him for his happiness, and to supply the place of all the resources of the animals. And because we are destitute of the instincts which they enjoy, and that we have so many necessities to answer, we are obliged to have recourse to our reason to acquire a knowledge of the world, and of our own particular nature; to be diligent, active, and laborious, to secure ourselves from poverty, pain, and vexation, and to render our lives peaceable and happy. The faculty of reason also enables us to restrain our unruly passions, and preserve our minds free from the delusive influence of pleasures which might be fatal in their consequences. A few instances will suffice to illustrate this. If we could obtain without any labour fruits, and the necessary supply of food and other articles which we daily want, we should become idle and slothful, and pass our days in uninterrupted indolence; all the faculties of the soul, for want of exertion, would become enfeebled and enervated; the links that hold society together would be broken, because we should no longer depend upon one another; and children would have no occasion to apply to their parents for support and subsistence. The whole human race must then relapse

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into its former barbarism; and in a state of nature, each individual, like the brutes, would only live for himself; subordination could not exist, and all mutual obligations and good offices must cease. It is therefore to our wants that we owe the development of our faculties, and the prerogatives of humanity. They awaken the energies of our minds, give them activity and industry, and render our lives more pleasant and happy than those of other animals. Our very necessities, then, have rendered us sociable, rational, and orderly in our manners; and have led us to the invention of many useful arts and sciences. In general, an active and laborious life is advantageous and necessary to man. If his faculties and powers are not exercised, they become useless; he gradually gets into a state of stupidity, ignorance, and gross sensuality, with all their concomitant vices; whilst mental and bodily exertions give an agreeable activity to the whole machine, and procure as much satisfaction and delight, as it stimulates to industry, to science, and to knowledge.

Natural wants, then, were necessary to render us rational, wise, social, virtuous, and happy. If, after having been nourished with our mother's milk, we had no farther occasion for assistance or instruction, we should only live for ourselves, learn no language, nor make any use of our reason; stupified, and in the profoundest ignorance both of ourselves and of all other beings, we should neither know arts nor sciences, nor ever experience that elevation of soul which arises from cultivating its powers, nor those sweet emotions of the heart which those only feel who are concerned for the good of others. Whereas, in the present constitution of things, the wants of children, and their total helplessness when they first draw breath, oblige their parents to take care of them out of tenderness and compassion; whilst the children, on their part, become strongly attached to their parents by reason of their wants, and from their fear of danger suffer themselves to be guided by them, form themselves by their examples and instructions, to make a good use of their reason, and acquire a sense of propriety of conduct. They thus grow up in virtue, form useful members of society, and are placed in a condition of leading a respectable and happy life.

Possessing, then, all these advantages, we may readily dispense with those which animals appear to have over us. We have no need of furs or of feathers to cover us, nor of teeth or claws to defend us; of senses more acute than we now possess, or of instinct to enable us to procure what is necessary for our nourishment and preservation. These gifts of nature would degrade and reduce us to a perfection merely animal. Our senses and our reason, aided by our manual exertions, are sufficient to procure us clothing, food, and every thing necessary for our nourishment and preservation, as well as comfort and pleasure, with the abundant use of all the riches so exuberant in the kingdom of nature.

It is proved, then, that those wants of which so many people complain are the true foundations of our happiness, and the best means that divine wisdom and goodness could choose to direct the faculties

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of man to their greatest possible advantage. Thus it is in the power of all men, by conforming themselves to the views of Omnipotence, to escape much trouble and vexation; the great mass of misery would thereby be lessened, and we should have joyful cause to acknowledge that the sum of good is much greater than that of evil, that our afflictions are tempered by a thousand blessings, and that it is in the power of every man, by unwearied exertions, aided by virtue and integrity, to render his days felicitous, and his life useful to all within the circle of his influence.

OCTOBER XXX.

HYMN UPON THE POWER AND PROVIDENCE OF GOD.

God shall be my song. He is omnipotent: the Lord is his name: his works are great, and his government extends through all the heavens.

He wills, he speaks, and millions of worlds rise into existence: he threatens, and they are reduced to dust.

Light is his garment: his counsels are wisdom and truth. As God he reigns; truth and righteousness are the foundation of his throne.

Monarch of all the worlds, who is like unto thee? Without beginning of days, and without end of time, thou art eternal in the heavens, the incorruptible, unceasing source of glory, wisdom, and felicity.

All that is, was, or ever shall be, in heaven, earth, or sea, is known to God. He has contemplated his innumerable works from all eternity.

He encompasseth us: he watches over us, and under the shadow of his wings we rest in safety. None of our actions escape his penetration: he searches the inmost recesses of the heart.

He is always near us: when we lie down, and when we rise up, he is present: he knows our thoughts before we are conscious of them: if we climb up to heaven he is there; and though we should fly with the rays of the sun to the boundaries of the universe, or fathom the depth of the ocean, there he is also.

He knows our afflictions: he heareth our prayers, and sees all that passes in our souls. All our good actions are known to him, as well as those that are bad; and when we are in danger of falling, his merciful hand upholds us.

From eternity he has planned the welfare of man; we have nothing that does not proceed from him: we are wholly his; by his goodness we live. Let us therefore glorify his name, and continually sing his praises.

Who is able to comprehend and recount the grandeur and magnificence of God's creation? Every grain of dust displays his power;

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every blade of grass his wisdom; and the air, the sea, the hills, the valleys, and the meadows, declare his glory.

God waters the earth, and spreads a verdant carpet beneath our feet. His blessings encompass us: the day and night, the corn, and the fruit of the vine, joy and abundance, all flow from him.

Not a sparrow falleth to the earth without his will; and why shall man abandon himself to vexation, and not confide in the paternal cares of his God, his protector and constant supporter, under whose shelter and guardian power no dangers can overcome, no terrors appal? With God for our leader, we need not fear the united powers of darkness, of oppression, and of iniquity: though tempests roar and storms howl around us, we may in safety view the contending elements, and calmly contemplate the sublimity of nature, whilst we adore the Deity.

OCTOBER XXXI.

A HYMN OF PRAISE.

Thou, O Lord, hast created the hosts of heaven, and the myriads of angels, which unceasingly surround thy throne. The immense extent of the heavens, with all their magnificence, is the tabernacle of those blessed spirits which love and adore thee.

Thou hast adorned this globe of earth with a thousand beauties that delight our souls. The sun which animates so many spheres, which fertilizes our fields, and enriches us with so many blessings, never wanders from the vast orb which thou hast prescribed to him.

At thy command the moon's paler radiance nightly gleams in the heavens; and wherever we cast our view we perceive the effects of thy goodness, and thy blessings never cease to visit us.

Springs and fountains, that ever flow, preserve for us their pure and limpid streams. The mild dew waters and refreshes our meadows. The mountains and the valleys, the fields and the groves, present us with a thousand beauties; and the whole earth, which thy hand sustains in infinite space, is full of thy riches, crowned with thy blessings, and fertilized by thy bounty.

Let us bear without murmuring the afflictions of life; they are always solaced by some moments of enjoyment, and mitigated by the cheering influence of hope. The grand spectacle of nature animates our drooping spirits, and the rays of divine grace dry up all our tears.

But who can fathom the depth of thy ways? In this life, good and evil accompany each other. Earthquakes, tempests, war, pestilence, and famine, often disturb the happiness and security of men; and death, unrelenting and unsparing, spreads wide his devastation.

A breath overturns us, lays us in the tomb, and reduces us to dust.

But blessed be the Almighty God, the rock of our safety, and the tabernacle of our salvation, who has opened unto us the doors of eternal life, through Christ Jesus our Lord!

NOVEMBER I.

MARINE ANIMALS.

Independent of the great variety of plants, herbs, trees, and bushes, which grow and twine together at the bottom of the deep, there are so many different species of animals, that we cannot possibly know them all, much less can we enumerate the individuals that belong to each species.

Among this innumerable multitude of animated beings there is no confusion, but all may be easily distinguished; and in the sea, as every where else, a perfect order reigns. All these creatures may be arranged in certain classes: each one has its particular nature, food, mode of life, distinct character, and peculiar instinct. In the sea, as well as upon land, there are shades of gradation, and insensible steps from one species to another. Where one ends, the other begins. The stone, which is the highest link in the mineral kingdom, is half a plant; the plant, which terminates the vegetable kingdom, partly belongs to the animal kingdom; and the animal kingdom, which connects man with the brute creation, has some resemblance to him. In the sea, also, nature passes by just gradations from little to great, insensibly perfects the different kinds, and connects them all by one immense chain, no link of which is defective.

How prodigious is the multitude of inhabitants contained in the sea! What varieties are found among them! What diversity of forms, of instincts, and of destination! Some are so small as to elude our perception; others so large, that their enormous bulk inspires us with terror. Some of them are destitute of all beauty, and their colour so nearly resembles that of the sea, that it is with difficulty we can distinguish them. Others are adorned with the most brilliant and magnificent colours. Some species are very unprolific; and if it was not so, they would destroy all the rest. Others, again, multiply prodigiously, and are highly beneficial, by supplying men and animals with food.

'Lord, how numerous are thy works! In wisdom hast thou made them all. The earth is full of thy goodness: the great and wide sea, wherein are things creeping innumerable, both small and great beasts, display thy marvellous riches. There go the ships; there swims the huge whale, which thou hast formed to sport among the waves, the terror of the finny race, to play therein. All these wait upon thee, that thou mayest give them their meat in due season.'

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NOVEMBER II.

THE WISDOM OF GOD IN CONNECTING THE DIFFERENT PARTS OF NATURE.

As all the members of our bodies, taken collectively, form a whole, constructed and arranged with the utmost wisdom, so also the different varieties of natural productions may be regarded as so many members, of which Supernal Power has composed one perfect whole. A very slight attention is sufficient to convince us that every thing in nature is connected together, and linked so firmly as to form a perfect system. Different kinds of mineral earths nourish and support the vegetable kingdom, without which animals could not live; and fire, water, and air, are indispensably necessary to the preservation of the terrestrial globe.

There is, then, an indissoluble bond between all the various beings, animate as well as inanimate, which compose our globe; and philosophers have demonstrated that this globe itself has its necessary connecting links with the sun, the moon, and the whole creation. And to combine this immense multitude of different beings and substances, so as to form one complete whole, could only be effected by Omnipotent Wisdom. This alone could unite together so many millions of different creatures, and link them in such a manner that they should be continually connected, and mutually support each other.

That we may not be perplexed and confounded by the immensity of the universe, let us for the present confine our attention to our own globe, which is one of the most inconsiderable parts of the universe. The wisdom that we shall there discover may lead us to form some idea of that which is manifest in the rest of the creation. Let us begin with considering what is immediately before our eyes. If we examine the animal kingdom as to the relations it bears to the rest of nature, and reflect upon the wants which are common to all animals, we shall be struck with the admirable harmony that reigns throughout. Warmth, air, water, and light, are all indispensably necessary for the preservation of these creatures; but they must be administered in a just proportion: too much or too little would be equally prejudicial, and destructive of the order of nature. A great increase of heat would be fatal to all living creatures; for if our earth, taken as a whole, received more heat from the sun, in every climate the summer must necessarily be hotter than it now is; and experience teaches us that in all countries the heat is sometimes so great, that if it was only increased in a very small degree, either in intensity or duration, animals would die, and vegetables be parched up. On the contrary, if we had less heat we should not fare better; since at present the cold is sometimes so severe, that animals are often frozen to death.

The earth, then, receives from the sun that proportion of heat which is best adapted to the state of all living creatures, and any other degree of temperature might be prejudicial to them. As exact

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a proportion is also observed with regard to air. The rising of vapours principally depends upon the heaviness of the air, and the descent of rain upon its lightness. If the air was not capable of being condensed and alternately rarefied, of becoming at one time heavy, at another light, we should not have that diversity of temperature so necessary to the vegetation of plants and the life of animals. If the air was usually heavier than it is, it would be more charged with vapours, clouds, and fogs; and from its great humidity would be unwholesome, and injurious to plants and animals. If, on the contrary, it was lighter, vapours would not ascend, nor collect in form of clouds. It is the same every where: nature always observes a just medium; as all the elements are arranged in that manner which is best fitted for the preservation of animals, they are also in perfect harmony with all other natural things. The air is not only the medium in which those variations of temperature so necessary are produced; it is also the medium of sound, and has been appropriated to our ear; thus manifesting the operation of a marvellous wisdom; for if the air had been more or less elastic, denser or more rare, than it actually is, the ear would have suffered in consequence; and the human voice, now so sweet and harmonious, would have been more like the report of thunder, or the hissing of serpents. The air also contributes to the circulation of the blood, and penetrates into the smallest vessels. There are numerous other relations between the air and different beings; and in every instance it has all the properties that each requires.

If, then, we consider that many thousand species of plants and animals have an equal want of air, heat, and light; that each of these species is different from all the rest, that each has its certain and peculiar characteristics, that it is weaker or stronger than others, and that, notwithstanding this, the elements are equally well adapted to all, and sufficient to supply so many and such different wants; we must acknowledge that a boundless wisdom, which yields to no difficulties, has alone established the foundation of the universal connexion and wonderful harmony that reign throughout nature, and link together every being in the firm bonds of union.

In fine, every thing in nature is weighed, measured, and numbered, and destined to certain purposes. Not only the trees which rise so majestically, the plants which have such beautiful forms, the fields and the fertile meadows, the horse that renders us so many faithful services, the flocks which feed and clothe us, the mines that yield us ornaments and riches, the sea that supplies our table with the choicest luxuries, and which floats our navy to either pole, the stars which shine upon the earth; not only all these brilliant productions of nature, but the humblest mosses, insects, and shell-fish, combine in the general sum of perfection.

Infinitely powerful Being! Creator and Preserver of all things! Can I contemplate these objects without thinking of thee, and reverencing thy wisdom? Without thee all would be darkness, confusion, and disorder; without thy salutary influence there would be

no order, harmony, or pleasure in the earth. It is thy wisdom which beautifies, enriches, and preserves all; it vivifies and renders happy all the creation; and henceforth, and for ever, shall be the subject of my songs. I will unceasingly bless thee, O God, and sing hymns of praise to thy honour; for unto thee appertains all wisdom, power, and glory.

NOVEMBER III.

REFLECTIONS UPON THE SUMMER WHICH IS PASSED.

The fine summer days are now gone, and, except the sweet remembrance of our having once enjoyed them, have only left us emblems of frailty. How all the face of nature is changed! The rays of the sun faintly pass through the gloomy clouds, and fall upon gardens stripped of flowers, upon fields where scarcely any traces of cultivation remain, and upon hills where only a few scattered herbs are seen. The soft melody of the birds no longer floats on the air; and the mournful silence which universally prevails is only interrupted by the croaking of ravens, and the shrill cries of birds of passage, which leave us while they seek more temperate climes. The neighbouring mountains are deserted; the flocks have forsaken them; the bleating of lambs is not heard; and the flower-beds in our gardens are laid waste. How dull and gloomy are the fields which lately were so beautiful! Their delightful verdure is succeeded by a melancholy aspect, and their charms are withered. The clouds are heavy with rain, and thick mists veil the morning sun.

Such are the prospects which nature now presents; and who can contemplate them without thinking on the frailty and uncertainty of all earthly things? The fine days are no more; even whilst we were anxious to enjoy them they fled away. But have we a right to murmur at, or to question the dispensations of Providence? Certainly not. Let us rather call to mind those delightful summer days, and the innocent pleasures we then enjoyed, and we shall bless and adore the God of the seasons. What sweet sensations have we not experienced, what pure joys have visited our souls, when we contemplated the beauties of nature; when we watched the mountains and the valleys gradually become green; when the carols of the lark were heard among the clouds, and the plaintive melody of the nightingale stole upon the breeze, or poured along the groves; when we inhaled the fragrant breath of the flowers; when Aurora, rising from her rosy bed, smiled upon nature, and diffused around her joy and festivity; or when the forests and the hills glowed with the parting rays of the sun, retired beneath the western main! How rich are the presents we have received from the gardens, the fields, and the orchards! How exquisite the raptures of our imagination, and the pleasure of our senses! And can we think of the lovely months that are past

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without experiencing the sweetest emotions, and blessing the great Parent of nature, who has crowned the year with his blessings?

We now live upon the gifts of summer and autumn. We have seen with what activity nature laboured in those delightful seasons, to accomplish the beneficent views of the Creator in favour of man. How many plants and flowers has not the spring caused to bud; how many fruits has not the summer ripened; and how many harvests are gathered in autumn! At present the earth has completed her designs for this year, and is now going to enjoy a short repose.

Thus nature is continually active during the greatest part of the year; and even during the time of her apparent cessation from labour is not entirely idle, but is secretly preparing for a new creation. Let us ask ourselves the question, Have we been equally industrious? Have we so employed our time as to produce fruits? The husbandman now counts his sheaves; and shall we not be able to reckon some virtues, some good works? Have the pleasures of summer rendered us better, and more grateful? Have we, whilst contemplating the beauties of nature, lifted our hearts towards God? What have been our occupations during the long summer days? Have they contributed to the glory of God and the welfare of our fellow-creatures? While contemplating the sun, the flowers, and all that is interesting in nature, have we experienced such sentiments as the view of so magnificent a spectacle ought to excite? And can we testify that this summer, like many others, has not been lost upon us?

We are still blessed with life, and enjoy the power of reflecting upon the spring and the summer which are just departed; but since the first dawning of spring, ere the summer sun looked down upon the earth, how many souls have passed from these regions of day into the dreary confines of death! It is right, O Lord, that we, whom in thy merciful condescension thou yet permittest to draw the breath of life, should bless thee for our existence. But the period hastens when we shall also depart; perhaps we shall never behold the bloom of another summer. Let each one of us, then, seriously reflect upon the account he will have to give, when called upon, of the days which we have passed, and supplicate the God of mercy not to enter into judgment with us.

NOVEMBER IV.

INCONVENIENCE OF THE NIGHT.

At this season the nights become considerably longer, and certainly this arrangement is in some respects unpleasant. Though a part of the night is allotted to strengthen and refresh us by sleep, this very operation is a proof of our weak and frail nature. At the commencement of night all our labours are interrupted, not only from the want

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of light, but equally as much from the necessity of reposing our wearied nature, and recruiting our exhausted strength.

It is, then, by no means extraordinary, that the nights appear long and tedious when we are restless and sleep eludes our desires. How anxiously the sick man counts the hours, and longs for the approach of morning!

Another inconvenience of night is that we are liable to lose our way, and encounter fatal disasters. When the sun has withdrawn his light, and night has spread her mantle over the earth, the traveller wanders uncertain of his way, and, unable to trace the path, falls among briers and thorns, bogs and quagmires; or, stepping over the precipice, is plunged into the gulf below. In the night-time we are also exposed to the attacks of the villain and the depredations of the plunderer, either abroad, or when we are retired to rest; for darkness conceals the steel of the murderer, and veils the deeds of iniquity. Another inconvenience of night is the cold that then generally prevails; and by its regular return we are constantly presented with an emblem of death.

There is neither continual day nor night upon the earth; and though the hours of darkness are so many during the winter, and even during the summer the return of darkness constantly divides the day, it is yet certain that God has favoured our globe with more light than darkness; an advantage which is still more increased by the twilight, as well as the light of the moon and stars. Blessed, then, be the Lord for the light of the moon and of the stars; for the rays of the sun, and the splendour of the noon-day! And more especially may his name be blessed for the glorious light which his gospel has diffused through the deep night of ignorance or error, and of misery. Pure rays have descended from heaven to illuminate the gloom in which we were involved; and let us ever remember in our darkest nights, in our moments of sorrow and adversity, that we are hastening on towards the regions of light and joy. Should it at any time happen that in the midst of midnight darkness sleep forsakes us, and disease or afflictions cause us to number the melancholy hours, let us console ourselves with the reflection that we are not plunged in the hopeless certainty of an eternal night; but that we are advancing towards the heavenly kingdom, the happy region, where night will not exist, where darkness will cease to alternate with light, and where will be no sickness, distress, or sorrow.

Blessed be the Almighty that the night of ignorance and misery which envelops us in gloom is not eternal. Heaven and endless glory shall be the portion of the righteous. Hasten on, thou sun, and ye radiant stars, that blaze in the firmament, hasten to finish the course which is prescribed to you; that the time of trial, the revolutions of day and of night, the months and the years which are allotted me, may be speedily terminated. Enable me, thou light of faith, to hail the dawn of that glorious day when the season of night and the darkness which now encompass me shall vanish for ever! Blessed morning of eternity, hasten to open thy bright portals, and crown my

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anxious hopes! My soul longs to wing its flight to those happy abodes of the righteous, to that fair city which endureth for ever, where eternal day reigns, and no night, no weariness, retards the progress to all perfection, knowledge, and felicity.

NOVEMBER V.

WOODS AND FORESTS.

The surface of the earth presents not to the eye a more beautiful picture than that of woods and extensive forests; and an enlightened observer, who calls every thing excellent that is good and useful, finds in them much that is worthy of his attention. Let us, then, visit these woodland scenes, which will supply us with so many sources of admiration and gratitude.

While our walks in the fields and meadows are less agreeable than they were in the late fine season, the forests will be more interesting, and productive of real pleasure. There is no place more proper to dispose our minds to reflect upon the grandeur and beauty of the works of nature than a lonely wood: the solitude of the place, and the profound silence which reigns there, dispose the mind to look back upon itself, and awaken the powers of the imagination.

At first the number and variety of the trees attract our attention. What distinguishes them from each other is not so much their height as the difference that is observable in their manner of growing, in their leaves, and in their wood. The resinous pine is not remarkable for the beauty of its leaves, which are narrow and pointed, but, like those of the fir-tree, they last long, and their verdure during the winter is very pleasing. The foliage of the lime-tree, the ash, and the beech, is much more beautiful and diversified; their verdure is admirable, it cheers and refreshes the sight; and the broad dentated leaves of some of these trees are beautifully contrasted with the narrower and more fibrous leaves of others. We are yet but imperfectly acquainted with their seed, fecundation, and the different properties of their fruits. How many uses are made of the wood of trees! The oak, whose growth is very slow, and whose leaves do not appear till those of most other trees are in bloom, supplies us with a very hard and durable sort of wood, which art knows how to employ in a great variety of works, which are so lasting as in some instances to brave the ravages of time. The lighter kinds of wood serve for other purposes; and as they are the most abundant, and grow quicker than any other, they are of more general utility.

It is to forest-trees that we are indebted for great part of our houses and our ships, for fuel, and for various implements, furniture, and utensils. The industry of man leads him to polish, turn, and carve wood into a variety of works not less elegant than useful.

The divine wisdom has distributed forests over the earth with

more or less abundance. In some countries they are very distant from each other; in others they occupy many leagues, and rise majestically into the air. The want of wood in some countries is compensated by its abundance in others; and neither the continual use that men make of it, the destruction of it by accidental conflagrations, nor the great quantities consumed in severe winters, have been able to exhaust this rich gift of nature. In the lapse of twenty years we may see a forest where we before only saw some low copse, or a few scattered trees.

All this ought to convince us of the power and goodness of our heavenly Father, whose wisdom is so superior to that of mortals, and who has foreseen the necessities of men in all possible circumstances. In those countries where the cold is most severe, or where wood is chiefly wanted for the purposes of navigation, the most extensive forests grow; and from their unequal distribution a very lucrative source of commerce is derived, forming a new bond of connexion amongst men. We all participate in the numerous advantages which woods afford; and in creating forests God has provided for the good of each individual. Blessed be our heavenly Father, who has mercifully vouchsafed to interest himself on our behalf, before we even felt our wants, or could represent them to him! In every thing he has anticipated our desires; and may we each individually endeavour, by fulfilling the great ends of our creation, to pay the tribute of gratitude, of love, and of praise, so justly due to the God of all goodness!

It has not been intrusted to the care of man to plant and maintain forests; God has reserved this labour to himself; he plants and preserves the trees, while man has little share in their cultivation. They grow and multiply independently of our cares; they continually repair their losses by new shoots, and are always sufficiently abundant to supply our necessities. To be convinced of this we need only consider the seeds of the lime-tree, the maple, and the elm: from these small seeds vast trunks proceed, whose leafy tops rise into the clouds. It is the Almighty God who alone has established them, and who supports them for ages against the efforts of winds and the shocks of tempests. It is he who sends the dew and rain yearly, to recruit the verdure and preserve their youth.

The earth which bears the forests does not create them, neither, to speak correctly, does it nourish them. The verdure, the seeds, and the blossoms of trees, which they yearly lose, and yearly renew, and the sap which is continually dissipated, are losses which would at length exhaust the earth if it alone supplied them. Of itself it is a heavy, dry, and barren mass, which draws from other sources the juices and nourishment which it conveys to trees and plants. The principles of their growth do not proceed from the earth; the air furnishes in abundance water, salt, oil, heat, and all other matter which trees require.

Let us, thus favoured with so many blessings, contemplate that Being who is the Author of all our good. The forests and the woods

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are the heralds of his bounty; and we should be guilty of the basest ingratitude if we did not acknowledge this benefit, which we witness daily in our houses and in our gardens, or wherever we direct our view.

NOVEMBER VI.

THE SENSE OF FEELING IN ANIMALS.

Feeling may be justly regarded as the universal sense of animals, and the foundation of all other sensations; for seeing, hearing, smelling, and tasting, cannot take place without an impression being made. As the sense of feeling operates differently in seeing from what it does in hearing, and in hearing from what it does in the other organs of sensation, we may with propriety distinguish the sense of touch, properly so called, from that universal sensation which we have just mentioned. They are both produced through the medium of the nerves. These, of which anatomists enumerate ten principal pair, resemble small cords or filaments united together, derive their origin from the brain, and are distributed to every part of the body. Wherever there are nerves, there may be sensations; and wherever is the seat of any particular sense, there will also be found nerves that are the general organs of that sensation. There are optic nerves and auditory nerves, olfactory nerves and gustatory nerves, as well as nerves subservient to the sense of feeling, that like it are distributed to every part of the body. These nerves proceed from the brain; whilst others pass off from the spinal marrow, through the lateral openings of the vertebræ, and are then distributed to every part by innumerable ramifications. The nerves subservient to the general sense of feeling are also found in the organs of all the other senses, because, independently of their own particular sensations, each of these organs must be susceptible of feeling. Hence the eyes, ears, nose, and mouth, receive impressions that altogether depend upon feeling, and are not produced by the nerves proper to these organs.

That sensation is produced through the medium of the nerves is certain, for each part feels more acutely in proportion as its number of nerves is greater; and there is no feeling in those parts where the nerves are destroyed, or where no nerves exist. Incisions may be made in the fat, bones may be amputated, nails pared, and hairs cut, without any pain being inflicted; or if any is supposed to be felt, it is merely the effect of the imagination. The bones are enveloped in a nervous membrane, and the nails are attached to a part where many nerves intersect each other, forming what is called a plexus of nerves; and pain is only felt when some of these are wounded or irritated. So that when we feel the pain commonly called toothache, the tooth, being a bone, is not susceptible of feeling, but the nerve attached to

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it is extremely sensible, and occasions us to feel the most acute pain when it is irritated.

In thus diffusing the sense of feeling over the whole body, the Creator has evidently had our well-being in view. The other senses are situated in those parts where they can most conveniently perform their functions. And as it was necessary for the preservation and welfare of the whole body, that each of its parts should be informed of what might be useful or prejudicial, agreeable or disagreeable, it was necessary that the sense of feeling should be diffused over every part of the body. It is a still farther proof of divine wisdom, that several species of animals have the sense of feeling more acute than falls to the lot of men: for their acuteness of feeling is necessary in their mode of life, and compensates their deprivation of some other senses. The horns of the snail, for example, possess an exquisite sense of feeling, and the least obstacle causes them to be drawn in with extreme celerity. How delicate also is the feeling of the spider, since in the midst of the web which it has so ingeniously woven, it perceives the slightest vibrations which the approach of an insect may occasion! Without dwelling, however, upon the sense of feeling in animals, it is sufficient to consider it in man for our admiration to be abundantly called forth. How can the nerves, which seem to be merely susceptible of more or less length, breadth, tension, and vibration, transmit to the soul so many different impressions and sensations? Is there between the soul and the body such a connexion, that nerves of a determinate size, structure, and tension, shall always produce certain sensations? Has each organ of sense nerves so constituted, so analogous to the small particles of matter which emanate from bodies, that the impressions they receive from them should be always followed by certain determinate sensations? To these questions it may be answered, that our knowledge upon the subject is too limited to ascertain the immediate cause of these effects, and we are obliged with all humility to acknowledge, that the mystery is at present impenetrable.

Let us, then, be content, and give thanks unto God, that with the other senses which he has bestowed upon us, he has also granted us that of feeling. If our bodies possessed less sensibility, of how many pleasures should we not be deprived? We could neither have discerned what would be advantageous to us, nor what would have been prejudicial. Happy would it be if we had as exquisite a sense of what is good for our souls; if we rightly appreciated what is excellent and honest; if our desire for holiness equalled our love of pleasure.

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NOVEMBER VII.

REMEMBRANCE OF THE BLESSINGS WHICH WE ENJOYED IN SPRING AND SUMMER.

Let us assemble together, and acknowledge the goodness of our God. Let us gratefully remember the moments that have sweetly glided away, while we reposed on the bosom of joy, and, free from care and inquietude, suffered our hearts to expand with delight at the renewal of nature; when devotion accompanied us to the verdant bower, and every tinge of melancholy was effaced from our abodes; and while we walked along the flowery paths, every where beholding the joyful traces of the Deity.

When from the thick bush, whose leafy shade had attracted the aerial songsters, burst upon our ears melody more ravishing than the sounds of the sweetest flute, and produced those exquisite sensations which fill the heart with delight, and dispose the mind to enjoy the pleasures of friendship, harmony, and peace; smiling nature lavished upon us her sweets, and we inhaled the fragrant breath of the rose; whilst the pink and hyacinth diffused their odours far around; and the zephyrs, gently playing upon the yielding flowers before night had closed their charms, wafted over us the scented gale; then pure delight and soft emotions glowed in our hearts, our souls confessed the sweet transport, and our lips, singing in unison with the warbling of the birds, attuned the praise of the eternal God.

Often when cool breezes had refreshed the burning summer air, and the birds began to be animated with new life and vigour; when the clouds dispersing had left the deep azure of heaven clear, and the sun promised a continuance of his unobscured splendour; pleasure lent us wings, and in sportive mood we quitted the noise and tumult of the town to rove in the green fields, or repose in the shady bower. There no trouble assailed us; wisdom, piety, joy, and innocence attended us, whilst in some sequestered retreat we indulged the love of nature. The leaves, gently breathed upon by the evening gale, while they formed around us a pleasing shade, diffused a refreshing coolness; and nature there drew from the richest springs that contentment which she bestows only upon the pure heart. There our bosoms, filled with the sweetest emotions of our own happiness, and love of our Creator, throbbed with joy, till the ready tear started from our eyes.

The gay songs from the groves poured through our hearts pleasure and gratitude. The joyful bleating of the flocks in the fat pasture, the wild note of the shepherd's pipe, and the buzzing of the beetle as it fluttered among the flowers, all impressed our souls with joy, and elevated our thoughts to the Creator, whose wisdom was thus displayed in the waters, in the air, in the cattle, the insects, and the flowers. The country all cheerful and gay, like the happy abode of our first parents, presented itself before us. Skirting the distant hori-

zon, we perceived the dark shade of ancient forests, and hills gilded by the rays of the sun. The beautiful mixture of the most diversified colours, rural flowers, golden harvest; the rich verdure of the carpet wrought by the hands of nature; the treasures of the meadows; the sweet food of the grazing herbs, that yielded us their wholesome milk; the bread of man yet green in the ear; were all objects sufficient to call forth the praise and the gratitude of a feeling heart.

There nature displayed before our ravished senses the majesty and the beauty of her eternal Author; and we then said, This magnificent universe is too beautiful, too grand, to be the abode of men who can regard it without emotion. For man the wings of the wind waft their refreshing breezes; for him the rivulets pour along their murmuring streams, while at noontide he rests from his labours, and seeks the cool retreat; for him the corn sprouts, and the trees bring forth their fruits; all the creation serves him, and he regards it not.

Yet those who love their Lord will discover in the breeze and in the brook, in the fields and in the flowers, in the blade of grass and in the ear of corn, traces of his eternal sapience, and proofs of his unutterable love and power. The vast creation is the sanctuary of God; the world is a temple consecrated to his glory; and man was designed to be as the priest of nature, and not the oppressive, destructive tyrant of defenceless beings.

NOVEMBER VIII.

FOREIGN ANIMALS.

Every portion of the earth has animals peculiar to itself, and the Creator has placed them in one country in preference to another, for the wisest reasons. The elephant and the camel are the most remarkable animals of the southern countries. They surpass all others in size: the elephant, in particular, is like a living mountain, and his legs are like pillars. His head is fixed upon a very short neck, and armed with two weapons of defence, with which he is able to tear the trees up by the roots. With a longer neck he could not have supported the weight of his head, nor have kept it in an elevated position: to make up for this he has a very long trunk, which he uses as a hand to reach food to his mouth without being obliged to stoop for it. He can not only move, bend, and turn his trunk in all directions, to perform what we do with our fingers, but he also uses it as an organ of sensation. His eyes are small in proportion to the size of his body, but they are brilliant, full of fire, and very expressive. In a state of nature the elephant, though wild, is neither sanguinary nor ferocious; his disposition is gentle, and he only uses his natural weapons for self-defence. Unless he is provoked, he does no one any harm; but when irritated, and roused by ill treatment, he is terrible; he seizes his enemy with his trunk, shakes him in the air, and puts

him out of existence by trampling him under his feet. He eats a hundred pounds of grass in a day, and his body being of such an enormous weight, he bruises and destroys much more with his feet than he consumes for food. His principal enemy, and often his conqueror, is the rhinoceros, an animal which somewhat resembles the wild boar, and uses the horn upon his nose to pierce the belly of the elephant.

A very little attention will be sufficient to enable us to discover the wisdom of God in the formation of the elephant: he has produced it in a country abounding in grass, and has prevented its being burdensome to the earth by multiplying too fast; for the female is with young two years, and does not couple with the male till three years after.

The camel is one of the most useful animals of the east: it is admirably formed to support the severest fatigues in the midst of dry deserts and burning sands; is able sometimes to remain four or five days without drinking, and requires but little food in proportion to its bulk. It crops the few plants and shrubs that grow in the deserts, and when none of these are to be found, a small quantity of beans and barley will suffice it for a whole day. Besides the hump upon his back, its make is altogether singular; it has two gullets, one of which terminates in the stomach, the other in a sort of bag, that serves as a reservoir for water, which remains in it without becoming putrid; and when the animal is thirsty, and has occasion to moisten its dry food, it throws up into its mouth a portion of the water, which having performed its office, returns with the food into the stomach. The ordinary load of a camel is from seven to eight hundred pounds weight; with this weight they will travel several miles in an hour, and continue for twelve or fifteen hours at a stretch.

Among the quadrupeds of the northern regions the most remarkable are the elk, the sable, and the reindeer. The first of these animals is large, strong, and well-shaped. Its head, in form, size, and colour, nearly resembles that of the mule; its legs are long, and of great strength; its skin is of a light gray hue. This animal is timid, stupid, and simple. He finds proper food every where, but selects, if possible, the bark and young shoots of the willow and the birch. He is extremely agile, and with his long legs can make much way in a short time.

The sable wanders in the forests of Siberia, and is much prized for its beautiful fur. The chase of this animal is generally the occupation of those unfortunate wretches who are exiled to the deserts.

The reindeer is an animal of a beautiful and elegant form, nearly resembling the stag. It provides its own food, which consists of moss, grass, the leaves and buds of trees. The inhabitants of the north derive great advantages from it; they eat its flesh, drink its milk, and, yoking it to a sledge, are drawn over the ice and the snow with wonderful speed. All the wealth of the Laplanders consists in their reindeers, whose skins furnish them with clothes, beds, and tents; and in fact they derive from this animal all the necessaries of life.

How vast and extensive is the empire of God, who has formed all species of creatures, and adapted them to every region of nature, that they may contribute to the happiness of his people in all parts of the globe! Blessed be his name for ever and ever.

NOVEMBER IX.

DIVERSITY OF WINDS.

The variation of the winds is considerable. In some places they are constant during the whole year, always blowing in the same direction; in others they change at certain periods, and observe certain and regular laws. In the open sea, between the tropics, and for some degrees beyond them, an easterly wind continues all the year round without any considerable variation. To the north of the line the wind blows towards the north-east, and to the south of the line it blows towards the south-east, and that more or less, according to the position of the sun. This, however, only strictly holds in the open sea; for when islands and great continents obstruct the progress of this wind, they may change its course, and in certain places make it take a north-east direction. In the southern parts of the ocean a westerly wind generally prevails. The nearer we approach the coasts, the more variable is the wind, and it is still more so as we advance farther inland.

The constant east wind is chiefly caused by the heat which the sun communicates to our atmosphere. In the Indian sea there are winds named trading winds, or monsoons, which continue to blow in the same direction from three to six months of the year, and during a similar space of time blow in the opposite direction. The causes operating to produce these are scarcely yet satisfactorily explained; but it cannot be doubted that the alternations of heat and cold, the position of the sun, the nature of the soil, the inflammation of meteors, the condensation of vapours into rain, and other similar phenomena, have great effect in their production. There are certain seas and countries which have winds and calms peculiar to them. In Egypt and the Persian gulf, during the summer, a burning wind, which stops respiration and consumes every thing, very frequently prevails. At the Cape of Good Hope, a cloud is sometimes seen to form, which the inhabitants term the fatal cloud, or ox-eye: at first it is very small, but soon visibly increases, and a furious tempest proceeds from it, which oversets ships, and precipitates them to the bottom of the sea.

Uncertain and variable winds, which have no determinate direction or duration, prevail over the greatest part of the globe; for though certain winds may blow more frequently in one place than in another, they do not return at fixed intervals, but begin and end without any regularity, and vary in proportion as different causes interrupt the

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equilibrium of the air. Heat and cold, rain and fine weather, mountains, straits, capes, and promontories, may contribute, in a considerable degree, to impede their course and change their direction. No doubt many other causes, which are unknown to us, influence the different modifications and agitations of the air.

What is particularly remarkable, and daily occurs in almost every place, is, that a little before sunrise the air is perfectly still and calm, when in a few moments after, just at the break of morning, a pretty brisk east wind begins to rise at the approach of the sun, and continues some time after he is risen. This undoubtedly proceeds from the air, heated by the rays of the rising sun, becoming rarefied, and by its consequent expansion displaces the contiguous air, and then produces an east wind, which ceases as the surrounding air also becomes heated. For similar reasons an east wind ought always to precede the sun in the torrid zone, and blow much stronger than in this country, because the sun's power here is much less than in the regions bordering upon the line. The wind, then, in the torrid zone constantly blows from east to west, whilst a west wind very rarely prevails in those parts.

From these observations we learn that winds are not the effects of chance, without either cause or design. In these, as in every thing else, the Creator manifests his wisdom and goodness; and he has so arranged them, that they are continually rising, and a dead calm very seldom happens. He regulates the motion, power, and duration of the winds, and prescribes to them the course they ought to take. Their very diversity is of use; for when a long drought has made plants and animals languish and droop, a wind proceeds from the seacoast, loaded with exhalations, waters the meadows, and gives new animation to nature. When this object is accomplished, a dry wind coming from the east restores the serenity of the air, and brings back fine weather. The north wind brings along with it numerous frozen particles, and purifies the autumnal air from its noxious vapours. Lastly, to the sharp north wind succeeds the south wind, and coming from the southern regions, it diffuses a grateful warmth through the air. Thus these continual variations of the winds tend to preserve health and fertility in the earth.

Who can make such reflections as these, and not adore God, in whose hand are all the elements, and whose word either bids them rage or calms their strife? At his command the storms and tempests roar, and, bursting from the ocean's depths, rush to earth's utmost boundary; when again, at his word, all is still and hushed, as on an autumnal evening, when not a breeze plays on the surface of the deep.

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NOVEMBER X.

THE CHASE.

At this season of the year the chase forms a very principal amusement with a certain class of men, and there is much reason to regret that so much importance is attached to it; for the dominion which man has over animals, and the pleasure which he takes in subduing them, is too frequently mingled with cruelty. It is true that sometimes the death of animals is necessary to enable us to make that use of them for which they are designed, or when their too great increase might render them troublesome or hurtful to us; but even then it behooves us to render their death as mild and easy as possible: yet, unfortunately, this is very little regarded by the generality of people; and men in this respect show themselves to be more sanguinary than the most ferocious beasts. How revolting from every feeling of humanity, and the dignity of rational beings, is the practice of hare and stag hunting! Can that be called an innocent pleasure, or a manly exercise, which instigates us to pursue with implacable fury a poor defenceless animal, which flies before us in the utmost agonies of fear and suspense, till, worn out with fatigue, it falls a helpless victim, whilst its groans and dying convulsions are hailed by the joyful shouts of the huntsmen? And is there a human breast that does not bleed at such a picture, or in human shape a monster who can behold such a sight without emotion? To purchase pleasure by the death of an innocent, inoffensive creature, and that death imbittered by the most cruel torments, is a dear sacrifice of our feelings: and surely that pleasure which familiarizes us with scenes of cruelty and of barbarity is dangerous and destructive of virtue; for it is impossible for the heart of that man to be good, and possessed of noble and generous feeling, who can hear with satisfaction the expiring groans of these animals; and it is equally impossible for him to be passionately fond of the chase, and centre in it a great share of his happiness, without gradually becoming indifferent to the calls of humanity, and deaf to the voice of nature. A man of this description is in great danger of becoming cruel and sanguinary; he will soon only derive pleasure from scenes of misery and destruction; and being accustomed not to feel for the sufferings of animals, in time he becomes equally regardless of his fellow-creatures. Hunting, then, will be considered by men of morality and religion as an occupation irreconcilable with the great duties we are called upon to fulfil; and those who are truly wise, and wish to be useful members of society, will seek more pure and innocent pleasures, and such certainly may be found.

We possess within ourselves the most abundant sources of pleasure, a mind and faculties, the cultivation of which is continually productive of the purest and most unalloyed delight; and in this the great science of the Christian and of the philosopher consists, and those who pursue it with perseverance acquire the art of being happy with-

out sacrificing their virtue, or destroying their feelings; on the contrary, by the continued improvement of their mind, and suffering religion to keep pace with knowledge, they attain that happy state which the world can neither give nor take away. To diversify their pleasures they have only to walk forth into the garden of nature, contemplate the grand and beautiful objects there displayed, or mingling in the cheerful society of men like themselves in the search of truth, enjoy that delightful converse which is unknown to the sensualist, the ignorant, or the vicious.

NOVEMBER XI.

DREAMS.

During the state of sleep the faculties of the mind are not entirely at rest; the imagination is often active, and ideas and images are present before us. Such is the case in dreams. However, the soul seems to have little share in them, except so far as relates to the memory. If we reflect upon our dreams, and examine why they are so unconnected and irregular, why the events represented to us are improbable, it will be found to proceed from our being more affected by sensations than perceptions. In our dreams we often seem to behold persons whom we have never seen before, or who are long since dead; we see them as if alive, and associate with them things that actually exist. If the soul acted as vigorously in dreams as when we are awake, a moment would suffice to collect and arrange our scattered and confused ideas; but its attention is usually confined to receive and follow the representations which are presented to it; and though objects often present themselves very forcibly, they are almost always strangely associated, without any regular connexion. Sensations succeed each other without the soul combining or arranging them. We have, then, only sensations, and not notions; for notions can only take place when the soul compares sensations, and operates upon the ideas which it has received through the medium of the senses.

It is singular that in dreams we never imagine that we hear, but only that we see; and it is still more remarkable that the images which we see often bear a most exact resemblance to their originals. Beautiful landscapes, which we have never attentively observed, are presented to us in dreams, more exactly delineated than if drawn by the most eminent artists.

As to the accidental causes of dreams, by which former sensations are renewed without the operation of any present and real impression, it must be observed, that in a state of profound sleep we never dream; we are conscious of no sensation, and our organs of sense are not acted upon by external objects. That sense which first yields to the influence of sleep is also the first that awakes, being the most lively and

active, and more easily excited than the external senses. When sleep is more imperfect, and less sound, dreams generally occur: former sensations are renewed; the internal sense, which, by the inactivity of the external senses cannot employ itself upon present impressions, exercises itself on preceding sensations, and of these generally prefers such as have most forcibly affected it; hence it is, that dreams are either very frightful or extremely agreeable.

Another circumstance in dreams worthy of attention is, that they are often characteristic of the nature of the individual. From the phantoms which haunt his imagination during the night, we may form some conclusion whether he is virtuous or vicious. A cruel-minded man continues to be so even in sleep; while the man of benevolence preserves in his dreams the same mild feature of character. It is, nevertheless, true, that an impure and vicious dream may be occasioned by the state of the body, or by external and adventitious circumstances. But our conduct, when first awake, will show whether or not such dreams ought to be imputed to us: we have only to observe what opinion we form of them at the time. The good man is not indifferent with respect to his dreams; and if, during his sleep, his mind has wandered from what is strictly just and virtuous, he is afflicted by it when he awakes. It generally happens, that the mind that reposes with a conviction of the favour of God, has, during a state of dreaming, ideas and representations of heavenly things. A good conscience often consoles a righteous man in his sleep, with the impression of his merits being rewarded by divine favour and approbation.

Sleep, however, is not the only time when wild and unconnected objects produce a confusion of ideas. How many people dream while awake! Some, from high opinions of their own importance and dignity, because the favour of a prince, or wealth, has raised them to some degree of rank. Others place their happiness upon empty fame, and feed their imaginations with the vain hope of immortal honour. Such beings as these, in the delirium of their passions, and in the intoxication of their self-love, may fancy that they are happy, and endeavour to make others believe it; but all such frivolous and deceitful felicity vanishes as a morning dream. They have been well described by an eminent prophet, when he said, 'They resemble an hungry man who dreameth that he eats; but he awaketh, and his soul is empty: or as when a thirsty man dreameth, and, behold, he drinketh; but he awaketh, and, behold, he is faint, and his soul hath appetite.'

Let us, then, never seek our happiness in vain phantoms, and delusive dreams; but henceforth aspire to obtain, through divine assistance, that wisdom which perisheth not, and that glory whose radiance endureth for ever, and which, when in the last awful moments of our existence we take a retrospect of our past life, will not add the sting of remorse to the painful separation of the soul from the body, nor cause the tears of hopeless repentance to increase the woe of our afflicted friends.

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NOVEMBER XII.

EVERY THING IN THE UNIVERSE IS CONNECTED TOGETHER, AND CONCURS TO THE PRESERVATION AND PERFECTION OF THE WHOLE.

Every thing which the beneficent Creator has produced upon the earth is admirably connected together, and contributes to the mutual preservation of the whole. The earth itself, the rocks, the minerals, and the fossils, all owe to the elements their origin and support. The trees, plants, herbs, mosses, and all kinds of vegetables, derive their subsistence from the earth; while animals, in their turn, live upon the vegetable kingdom. All these afterward return to their first principles. The earth supplies the plant with its nutriment, the plant the insect, the insect the bird, the bird the wild beasts; and in their turn the wild beasts become food for the vulture, the vulture to the insect, the insect nourishes the plant, and the plant the earth. Man himself, who converts all these beings to his own use, often in turn becomes their prey. Such is the circle in which every created thing revolves.

Thus all creatures have been created for each other, and no one solely for itself. The tiger, the lynx, the bear, the ermine, the fox, and various other animals, yield us furs for our covering. The hounds pursue the fleet hare, and hunt down the stag in the forests to supply our tables; while the portion they themselves receive of the prey is very small. The ferrets drive the rabbits from their deepest recesses into our hands. The horse, the elephant, and the camel, are trained to carry loads, and the ox to yoke to the plough. The cow gives us her milk, the sheep her wool; the reindeer draws the sledge with velocity over the snow and ice: the swine, the hedgehog, and the mole, burrow in the earth, and turn it up, that the seeds of plants may be more easily propagated. The hawk is subservient to the pleasures of the chase, and the hen gives us eggs. The cock's shrill cries awaken us in the morning, and the carols of the lark delight us in the day. The morning and evening are hailed by the melody of the blackbird, and the night is sacred to the varied notes of the nightingale.

The brilliant plumage of the peacock delights the lovers of gayety. Fish from the depths of the ocean swarm upon our coasts, and enter our rivers in shoals, and supply an abundance of nourishment to men, birds, and beasts. The silkworm spins, that we may be clothed with its precious web; and the bees for our use collect their sweets from every flower that scents the air. The sea casts upon our coasts multitudes of crabs, oysters, and various kinds of shellfish, for the use of men and animals. The lanternbearer, or great fly of Surinam, shines during the night, and gives light to the inhabitants of that country.

If we also examine the different occupations and labours of men, we shall find that they equally tend to the same end which nature

has proposed. The mariner tempts the dangers of the sea, and braves the storm, to bring to his country merchandise which does not belong to him. The soldier sheds his blood in the service of his country, and to preserve the well-being of his fellow-citizens. The lawyer is occupied in the affairs of others; and sovereigns and magistrates, who sit at the helm of government, devote their time and their faculties in steering it for the good of the commonwealth. Parents amass treasures for their children. The husbandman sows and reaps seed, a very small part of which falls to his lot to consume. Thus we do not live for ourselves alone; and the wise Author of Nature has so ordered in his infinite mercy, that all beings shall be useful to one another.

From this let us learn what are our moral duties. He who has power should succour the feeble. The man of learning should help with his advice those who are deficient, and impart of his wisdom to the ignorant. In fine, we should love our neighbour as ourselves; and by so doing we should the most effectually fulfil the designs of our Creator. The reciprocal duties which men owe to one another have induced them to form societies; for that which individual power could not effect is readily accomplished by united energy. No person could erect a stately edifice, or construct a palace, if he was obliged by himself to lay the foundation, dig the cellars, mould the clay, and bake the bricks, raise the walls, cover in the roof, make the windows, decorate the apartments, &c. But all this is easily performed when several artificers unite and mutually assist each other. Such is the constant law of nature, that in all the arts and sciences nothing beautiful or excellent can be effected without the concurrence of several persons. How many thousands of men are requisite to make a monarch powerful, and a nation renowned and prosperous!

In all this we have abundant cause to acknowledge the wisdom of our Creator, who, that all the inhabitants of the earth, and particularly man, might be happy, has established such relations and connexions among all beings, that one cannot subsist without the others. Experience daily teaches us that God has ever in view the welfare of his creatures: for this purpose the whole world was planned, and so arranged, that all its parts concur to promote the general happiness of mankind. Even those things which we consider as the least important, and to which we scarcely condescend to turn our attention, contribute to our felicity. The very insects which appear so despicable and insignificant, are highly useful to us. Thousands of hands are daily employed in satisfying our wants, and thousands of animals perish to support our lives. And in how many other ways, of which we are ignorant, is not nature active in our favour!

Merciful and indulgent Father! teach us how to appreciate thy goodness, and estimate our felicity; cause to arise in our hearts the desire of doing in future all that our limited faculties and strength will admit of, to promote the cause of righteousness among men, and to imitate thy goodness to us by assisting, according to our several abilities, those who are in need.

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NOVEMBER XIII.

COMMON SALT.

Salt forms the seasoning which is most extensively used, being common to the rich and the poor, the king and the beggar. Its savour is so grateful, and it possesseth such excellent properties for digestion, that we may regard it as one of the most precious gifts which nature has bestowed upon man. We procure it in different ways. The inhabitants of the coasts obtain it from the sea. They dig pits on the shore, which they call salt-pits, and plaster them with clay: at a full tide the sea flows into them; and the water which it leaves soon evaporates by the heat of the sun, and there remains at the bottom of the pits abundance of salt. In other places nature furnishes salt springs, fountains and lakes; and to obtain salt from these the water is evaporated in large caldrons. In some places, again, salt is found in solid masses in the mountains; the most celebrated mines are those of Catalonia and Poland. All these different kinds of salt are alike in their chief properties. Experience teaches us that a certain proportion of salt dissolved in the stomach has a digestive power, and prevents the putrefaction and too great fermentation of the alimentary matter. Hence it is used internally to assist and restore digestion; to remedy crudities in the stomach; to excite the appetite; and to stimulate the stomach, whose nerves it gently irritates, and favours all its operations. Common salt, then, may be regarded as one of the best digestives in nature; other salts act too powerfully, and are too disagreeable to the palate to be mixed with our food.

Salt is therefore a particular blessing, though perhaps it is less esteemed because of its universality. But were we in the practice of paying more attention to the blessings which we daily receive from God, we should have infinitely more cause to acknowledge and admire his goodness. Salt, besides the uses which we have enumerated, is interesting to the observer of nature, from its external appearance; the least particles of it seeming as if they were cut into eight angles, and six sides, like a die; hence such masses are of a cubical form. And here again we have an evidence of a Supreme Being, who has given to the salt an invariable form, and has shaped the different masses in the same model from the beginning of the creation; thereby proving that its origin is not owing to chance, or fortuitous circumstances, but to the will of an intelligent Being. And this thought is too important, and too essential to our present and eternal peace, to be disregarded, or not to be impressed upon our minds so deeply as never to be effaced.

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NOVEMBER XIV.

ORIGIN OF FOUNTAINS.

All great rivers are formed by the streams of smaller ones uniting, and these take their rise from brooks which fall into them; and the brooks derive their origin from springs and fountains. Of this there can be no doubt; but whence do springs proceed? Since water, by its gravity, as well as fluidity, always occupies the lowest parts of the earth's surface, whence can the water come which flows so constantly from the most elevated regions?

It is ascertained, in the first place, that rain, snow, and generally all the exhalations which fall from the air, supply a great portion of the water that flows from springs. Hence it is that fountains and rivers are so rare in Arabia Deserta, and in certain parts of Africa, where it never rains. The waters, then, insinuate themselves into the earth, where they penetrate till they are obstructed by beds of clay, through which they cannot pass; and thus accumulating, form fountains: or they collect in cavities, which afterward overflow; or the waters gradually rill through innumerable crevices, to the lowest places to which they can descend. Thus the water is continually flowing, and forms subterranean currents, which, uniting with more of the same description, make what is called a vein of water.

It is, however, very probable, that in some countries fountains do not owe their origin solely to the waters which descend from the atmosphere; for considerable springs and lakes are sometimes found on high mountains, which would seem not to be altogether produced by either rain or snow. There are many springs that in all seasons yield the same quantity of water, and even sometimes supply more during a time of great heat and long-continued drought than in moist and rainy weather. There must, then, be some other cause contributing to the formation and continuance of fountains.

Many springs are formed by vapours, which, being suspended in the atmosphere, are driven by currents of air towards mountains and elevated places, or by the power of attraction are drawn towards these great masses. The atmosphere is more or less loaded with aqueous exhalations, which being driven and pressed against hard and cold rocks, are condensed in drops, and thus increase the springs. We must, however, admit that all springs cannot derive their sources from this cause; for if this was the case, would not the Rhine, the Danube, and other rivers, which flow from high mountains, be dried up in winter, when these enormous masses are covered with ice and snow? Caverns which communicate with the sea, or with lakes, must contribute to the origin of fountains. The water of the sea having passed into these great cavities by subterranean canals, rises in vapours through a number of crevices, and forms drops, which, falling by their own gravity, sometimes take a contrary direction, because water cannot always make its way where vapours penetrate. Lastly,

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it is possible that the sea-water, particularly in countries bordering upon the ocean, may filter through the earth, and produce springs; and such springs have generally a taste resembling that of the waters whence they originate. But the springs which are met with near the summits of high mountains cannot proceed from such a cause, for the sea-water cannot ascend so high.

All the causes we have now enumerated contribute more or less to the origin of fountains; and perhaps there are still other causes operating, of which we are ignorant. Nature is always simple in her operations; but this simplicity does not consist so much in employing only one cause to produce each effect, as in employing in every case the fewest possible causes; by which the presence of auxiliary causes concurring to produce the proposed effect of nature is not prevented.

Be this, however, as it may, and though the origin of fountains were more doubtful and obscure than it really is, we must look up to God as the creator and preserver of these salutary springs. 'He speaks, and the fountains play from the bosom of the hills. The springs become rivulets, and these swell into noble rivers, which carry fertility and abundance through a country. The inhabitants of the meadows allay their thirst in the pure streams, and seek repose in the shady groves through which they gently flow.' God causes the beneficent fountains to spring from the high places of the earth: sometimes they wind among the mountains, till their meanders are lost amid the distant plains; or they precipitate themselves in cataracts, and increase by the union of different streams. Thus God preserves in the kingdom of nature that continual circulation which contributes to the fertility of the earth, the salubrity of our dwellings, and the evacuation of water, where too great abundance would be prejudicial to us.

NOVEMBER XV.

HAIR OF THE HEAD.

If we examine the curious structure and various uses of the hair which covers and adorns our heads, we shall find it well worthy of our attention, and discover in it evident proofs of the wisdom and power of God.

Each hair appears to the naked eye an oblong slender filament, with a bulb at the extremity thicker and more transparent than the rest of the hair. The filament forms the body of the hair, and the bulb the root. The large hairs have their roots, and even part of the filament, enclosed in a small membranous vessel or capsule. The size of this sheath is proportionate to the size of the root, being always rather larger, that the root may not be too much confined, and that some space may remain between it and the capsule. The root or bulb has two parts: the one external, the other internal. The external is a pellicle composed of small laminæ; the internal is a glutinous fluid,

in which some fibres are united; it is the marrow of the root. From the external part of the bulb proceed five, and sometimes, though rarely, six small white threads, very delicate and transparent, and often twice as long as the root. Besides these threads, small knots are seen rising in different places; they are viscous and easily dissolved by heat. From the interior part of the bulb proceeds the body of the hair, composed of three parts; the external sheath, the interior tubes, and the marrow.

When the hair has arrived at the pore of the skin through which it is to pass, it is strongly enveloped by the pellicle of the root, which forms here a very small tube. The hair then pushes the cuticle before it, and makes of it an external sheath, which defends it at the time when it is still very soft. The rest of the covering of the hair is a peculiar substance, and particularly transparent at the point. In a young hair this sheath is very soft; but in time becomes so hard and elastic, that it springs back with some noise when it is cut. It preserves the hair a long time. Immediately beneath the sheath are several small fibres which extend themselves along the hair from the root to the extremity. These are united among themselves, and with the sheath, which is common to them, by several elastic threads; and these bundles of fibres form together a tube filled with two substances, the one fluid, the other solid; and these constitute the marrow of the hair.

An attentive observer of the works of God must acknowledge, that his wisdom is displayed in the structure of a hair, as well as in the other parts of the human body. Thus, from the crown of the head to the sole of the foot, there is nothing in man that does not denote the perfection of his Creator. Even those parts which appear the least considerable, those which might be the easiest dispensed with, become important, if we consider them in their relation with the other members of the body, or if we examine their wonderful structure and destination. This particularly is the case with the hair. Yet there are many people who do not think it is worthy of their attention, and who do not imagine that any traces of the wisdom and goodness of God can be discovered in its formation. But, independent of the general principle, that there is no part of our body which is not useful, or without design, it is very easy to assure ourselves of the wise ends for which hair has been given to us. In the first place, it contributes very much to the beauty of the countenance; and perhaps this is its least use. It preserves the head from the effects of cold and wet, and promotes an insensible evacuation of superfluous humours from the body. Besides these; it may be useful in many other ways; and though we may not be acquainted with them all, we know enough to find great cause to admire and adore the wisdom, power, and goodness of our heavenly Creator in this as well as every other part of our structure.

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NOVEMBER XVI.

SYSTEM OF THE WORLD.

From the consideration of the earth, which hitherto has principally occupied our attention, let us elevate our thoughts to those innumerable worlds, compared with which this globe, which we and so many creatures inhabit, is but a point and a speck in the vast system of the universe. Let us examine, meditate, and adore.

In a preceding reflection we described the solar system, the revolution of the earth, and the course of the planets. To meditate upon the heavenly bodies, investigate their motion, order, and arrangement; to observe their magnificence, number, harmony, and beauty, fills the mind with the most sublime ideas of the Creator. We feel our own littleness, and bow, with awful reverence and devout humiliation, before that ineffable Being, whose throne is the starry heavens, and who, though surrounded by myriads of angels and cherubims, deigns, through the glory of numerous suns, to look down with compassion upon the sufferings of human nature, and cheer the heart of man with divine consolation. Glory be to God the Father, and the Son, for ever and ever!*

NOVEMBER XVII.

LOBSTERS.

Lobsters would be very deserving of our attention, even if they were of no use to us as an article of food. The females of these crustaceous animals, a little before this period of the year, undergo a great change. They cast off their old coverings, and acquire new ones: in thus changing their covering, they at the same time increase in size; and this manner of growing is peculiar to all crustaceous animals, which augment in bulk every time they throw off their old shells; and the operation is very painful. At the time of their change, their stomach also is renewed; for both it and the intestines are then detached from the body: they gradually dissipate, and it would appear that the animal, during that change, fed upon the parts which before were subservient to digestion. The small white and round stones, which are improperly called crab's eyes, begin to form when the stomach is destroyed, and are afterward enveloped in the new one, where they continually diminish in size, till at lenth they entirely disappear. There is reason to believe that the animal makes use of

* The translator has ventured to differ from the original very materially in the above reflection, which too nearly resembles one already written to be repeated, and must have escaped the author's attention.

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them as a remedy against the diseases of its stomach, or that perhaps they are the receptacle which supplies the matter which they use to repair the loss of their shells.

Except at the time when they cast their shells, these animals keep at the bottom of the water, at a little distance from the shore. In winter they prefer the bottom of deep water, but in summer approach nearer the shore, if the want of food does not oblige them to plunge deeper in the sea. To enable them more easily to seize their prey, nature has given them several arms and legs. Some of their claws at times are as large as the head and trunk taken together. They also possess the singular property of reproducing their claws and horns, when they have been broken; they can even get rid of them when they are troublesome. They can perform this operation in any posture; but it is more easily effected when they lie on their backs; and the shell is broken, and the flesh bruised with strong pincers at the third or fourth joint of the claw. Immediately after the wound, the animal bleeds; the pain causes a general shaking of the limb, and soon afterwards the wounded part detaches itself suddenly from the body. When the claw has been broken, a gelatinous substance oozes out, and stanches the blood; and if this was taken away, the animal would bleed to death. This gelatinous matter envelopes the rudiments of the new limb, which at first appears only like an excrescence, or small cone; and gradually becoming longer, takes the form of a limb, thus replacing the old one.

The manner in which these animals are propagated is very singular. The male carries the prolific matter in a very long thread. What chiefly distinguishes it is a double hook under the tail, which is not observable in the female. These animals are impregnated about autumn: and if at that time a female lobster is opened, the evidences of impregnation are perceived by the presence of several red clots. These gradually disappear; and under the tail, where the female has several little fibres, small round eggs are seen, resembling hemp-seed. The first eggs are visible in December, and soon amount to more than a hundred. As the warmth of the air increases, they grow larger, and before midsummer small live lobsters are found among the eggs, of the size of an ant, and which remaining attached to the fibres, under the mother's tail, are fostered there till all the eggs are hatched. They then detach themselves from these fibres, and clinging to those of the roots of trees and herbs, which grow in the water near the shore, they there remain enveloped, till they are sufficiently large and strong to abandon themselves to the waves.

The lobster may justly be regarded as one of the most extraordinary creatures that exists on the earth. An animal, whose skin is a stone, which it casts off every year, and receives a new covering; an animal, whose flesh is in its tail and feet, and its hair within its breast; whose stomach is in its head, and is yearly renewed, whilst the first function of the new stomach is to digest the old one; an animal that carries its eggs in the interior of the body while they are unimpregnated, but when that operation has taken place carries them exter-

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nally under its tail; an animal with two stones in its stomach, which are there engendered, and receive their growth, and upon which it feeds till they are consumed; an animal which of itself can get rid of its limbs when they are inconvenient, and which replaces them with others, and whose eyes are placed on long moveable horns; must ever be regarded as a most singular creature, furnishing us with new motives of admiring and adoring the wisdom and power of the Almighty Creator.

NOVEMBER XVIII.

ADVANTAGEOUS SITUATION OF ALL THE PARTS OF THE HUMAN BODY.

If we attentively examine the different parts which compose the human body, we shall find that they are situated in the most convenient manner for their different uses. It belonged to the Creator to arrange them as seemed best to him, and his wisdom has assigned to every member that place which is most proper for it; and in forming our bodies, he has not only provided for their necessities and conveniences, but he has also paid attention to their beauty and ornament.

With regard to our wants, it is manifest that all the parts of the body are situated in the most convenient manner. Our body was to be a machine, capable of moving of itself, by the power given to it, without the necessity of receiving an impulse from an external force. It was requisite that our limbs should execute with promptitude and celerity the volitions of our soul. All the bones are united to each other; and that we may easily use our limbs, extend or shorten the arm, lower or raise ourselves at pleasure, the bones are divided into several articulations, and each one is terminated by a round head, which is received into a cavity formed for it in another bone, and it moves in this without any inconvenience, because it is covered with a smooth and polished cartilage, and moistened by an oily fluid, which thus prevents the cartilage's suffering from friction. It is very remarkable that these bones are yet so firmly fixed in their sockets, that they do not slip, and move from each other, though the feet have to support such a heavy burden, and the hands are sometimes obliged to bear very heavy weights.

God has also provided for our convenience in the arrangement and disposition of the different parts of our body. The determinations and desires of the soul may be executed by the different organs of the body without trouble or impediment. By means of the senses the mind is readily informed of all that can interest it, and the different members of the body obey its orders. The eye, which watches over the whole body, occupies the most elevated place; it turns with facility in all directions, and can observe all that passes. The ears are also placed in a conspicuous situation, on each side of the head, and they are open day and night to communicate to the soul every im-

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pression of the mind. As the aliments have to pass into the mouth before they arrive in the stomach, the organ of smell is placed immediately above, to preserve us from eating any thing noxious or prejudicial. As to the sense of touch, it has not its immediate seat in any one particular place, but is distributed to every part of the body, that we may be sensible of pleasure and of pain, of those things that are injurious, and of those that are salutary. The arms, which are the ministers that the soul employs to execute most of its desires, are situated near the breast, where the body has the greatest power, and without being too far distant from the inferior parts, they are placed in that manner which is most convenient for all kinds of exercise and labour, and for the defence of the head and other members.

Lastly, the Creator, in forming our body, has also condescended to attend to its beauty; which he has made to consist in the harmony and exact proportion of the members, and in the agreeable blending of colours, with a fine and delicate skin. Thus we see that the parts of the body which are double, as the eyes, the ears, the arms, the legs, are placed on each side of the body at an equal height, answering to right and left; while those that are single, as the forehead, the nose, the mouth, and the chin, are situated in the middle. This proportion obtains in the small as well as in the great. The length of the sole of the foot makes the sixth part of the height of the whole body, as that of the face is the tenth part. In infants, the head is greater in proportion to the rest of the body; the reason of which is, that the head being the principal part of the body, and the seat of the senses, it ought sooner to arrive at perfection; and the more so, as being chiefly composed of bones, it cannot extend like the fleshy parts, which otherwise it would have done. For in infancy we observe, that all the limbs grow at the same time, and extend themselves in length, breadth, and thickness, in such exact proportion, as always to be in harmony with the size of the whole body.

Admire, then, O man, the perfection and beauty of thy body; the relation, harmony, and proportion which are preserved in all its parts! Observe how each member is connected with another, without their ever being embarrassed, or impeding each other in their different functions; how they are placed in the most suitable places of the body, the more easily to fulfil their different functions, and mutually to assist one another! All these organs are so many springs in the wonderful machine; they correspond together, and act in concert to complete the several purposes for which they are designed. Be careful not to destroy this beautiful machine, nor injure it by thy disorders and excesses. Be careful not to degrade it by base and infamous passions; but so act that thy body may be a living monument of God's wisdom and goodness. And more especially neglect nothing that can tend to improve thy soul, which has been so debased by sin; and use all thy endeavours to re-establish it in its original purity by the grace and mediation of thy Redeemer.

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NOVEMBER XIX.

ORDER AND REGULARITY OF NATURE.

When we contemplate the world, we discover in every direction the traces of a supreme intelligence, which has ordered every thing, and foreseen all the effects that would result from the powers which were imparted to nature; an intelligence which has considered, weighed, and measured all things to answer his designs with a wisdom that is infinite. Thus, the universe being once formed can subsist for ever, and constantly fulfil its destination, without any necessity for the first established laws being changed; whilst the contrary is too often the case with the works of men. Machines the most skilfully constructed soon cease to answer their intended purposes: they require frequent repairs, are soon worn out, and rendered unfit for use. The cause of these derangements and irregularities is to be looked for in their general construction; for there is no artist, however able he may be, who can foresee all the changes to which his works will be subjected, much less can he obviate them.

The corporeal world may also be regarded as a machine, whose component parts and different uses are innumerable. It is divided into several globes, luminous and opaque, which serve for habitations to an infinite number of living creatures of every species. The opaque globes move in orbs prescribed to them, and at regular periods, round the luminous globes, and receive from them their light, heat, day and night, diversity of seasons and temperature, growth, and nourishment, according to the nature and wants of the different inhabitants. The position and mutual gravitation of the planets are so diversified, that it seems also impossible to determine beforehand the time when they will return to the point whence they set out, and recommence their periodical course; and, notwithstanding the diversity of phenomena which these globes present to us, and the astonishing multiplicity of their movements, it has not once happened, in the course of thousands of years, that these enormous masses have ever in the least interrupted or obstructed each other in their revolutions. All the planets regularly traverse their orbs in the time allotted them. They have always preserved their order and respective distances, and have not approached nearer to the sun. Their forces are always in equipoise, and preserve the same relation to each other. The fixed stars are the same to-day as they were a thousand years ago; nor has any alteration taken place in the height of the sun, the duration of night and day, or the length of years and seasons. An incontestable proof that in the first arrangement of the heavenly bodies, in the measure, the laws, and the relations of their forces, in the regularity and rapidity of their course, the Author of Nature has foreseen and determined the future state of the world, and of its component parts, to the utmost limits of time.

The same may be said of our earth, inasmuch as it is annually

subjected to different revolutions and changes of temperature. For though it may at first seem as if fine weather, cold, heat, rain, dew, snow, hail, storms, lightning, and winds, vary indifferently, and are dispensed by accident; that it is by mere chance that waters inundate the earth, and convert dry land into lakes, and produce continents where once were seas; that some mountains are formed, whilst others moulder into dust; that rivers dry up, or change their course; yet it is certainly true that each modification of our earth has its sufficient cause in that which precedes it, and the whole in that which was established in the beginning of the creation.

Nothing is more proper to convince us how little we know of the particular causes of natural events, and their connexion with the future, than that diversity which we observe in the temperature of the air; a diversity that has so much influence upon the aspect and fertility of our globe. In vain may we multiply our meteorological observations; we cannot with any certainty deduce from them certain rules and consequences for the future; and we never find one year exactly resemble another. However, we are well assured that these continued variations, this seeming confusion of the elements, neither alter the figure of our globe, destroy its equilibrium, nor render it uninhabitable; but, on the contrary, that they are the true means of preserving, from year to year, its order, fertility, and abundance.

Thus the world is not composed of unconnected, disjointed materials, of parts without relation or dependence upon each other; but is a regular and perfect whole, whose structure and arrangement are the work of a supreme intelligence. If we see in the world a multitude of beings with the same nature and destination as ourselves, and catenated together by a number of links; if we discover classes and species of other creatures still more numerous, which have also mutual ties of connexion, more or less distant; if we acknowledge that by the mixture and action of the elements all these animated beings are supported, and receive all that their nature requires; and if we then elevate our views, and, carrying them further, consider the relations which exist between our earth and the heavenly bodies, their constant regularity of motion, the conformity and wonderful harmony that prevail between all the spheres within our sight, we shall be more and more filled with admiration and astonishment at the magnificence, order, and beauty of nature, and shall be more deeply convinced of the infinite wisdom of the Creator; and from what we are permitted to know at present of the beauty and harmony of the material world, we may form some faint idea of the glory of that eternal light which will one day manifest to the righteous, in the regions of bliss, the presence of their God, and enable them to read in the book of wisdom.

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NOVEMBER XX.

OF WINTER IN THE NORTHERN COUNTRIES.

The time now approaches when the discontent of many people is excited. The rigorous season of winter seems to them to counteract the otherwise sage and beneficent plan of the Father of the universe: the rich complain that nature is become desolate and dreary; and the poor murmur because in this season their necessities are increased, and their indigence is more oppressive. Though ungrateful men may magnify the inconvenience and the miseries of winter, they will be forced in the end, if they compare their lot with that of some other nations, to acknowledge how much goodness and mercy God extends to them in this respect.

In many of the northern countries there is neither spring nor autumn, while the heat in summer is as insupportable as the cold in winter; which last is so intense, that spirits of wine congeal in thermometers. When the door of a heated chamber is opened, the external air, penetrating it, converts into snow all the vapours which it contains, and the people who are in it are thus encompassed in a cloud of white thick flakes. If they go out of their houses they are nearly suffocated, and the air seems to tear their lungs. Death appears every where to reign, no one daring to quit his abode. Sometimes the cold is so severe, and comes on so suddenly, that if a man cannot escape with sufficient celerity he is in danger of losing an arm or a leg, or even life itself. The fall of snow is still more dangerous; the wind driving it with such violence, that the roads are blocked up, the trees and bushes are covered with it, and every step plunges the unwary traveller in some new precipice. In summer, for three months successively, there is constant day; and in winter, for the same space, there is a continued night.

What would those people say, who complain of its being cold in this country, if they were obliged to live in such a climate as that which we have just described? It is certain we do not sufficiently know the advantages we possess, or a very slight reflection would suffice to render us content with our lot. The days of winter, however severe we may think them, even in this country, are, nevertheless, supportable; and if some people suffer much from them, it is commonly owing to improper living that they have reduced themselves to such a state of effeminacy.

Some people will perhaps ask, why the Creator has assigned as an abode to so many thousands of men countries where, during a great part of the year, nature is seen clothed with terror? Why has he not favoured these people as much as he has blessed us? Vain questions! It is an error to suppose that the inhabitants of the poles are unhappy from the severity and length of their winters. Poor, but exempt by their simplicity from all desires difficult to be gratified, these people live contented, and are happy in the midst of the icy rocks which en-

compass them, without knowing the comforts that the inhabitants of more temperate countries regard as the most essential to their felicity. If the dryness of the soil prevents the productions of the earth from being so varied as are those of our climate, the sea compensates for it by gifts equally rich. The manner in which these people live inures them to the cold, and enables them to brave the storms; and nature has supplied them with the necessary assistance to support the rigours of their climate. She has given them the reindeer, from which they obtain their nourishment, bedding, clothing, and tents; and thus their principal wants are satisfied by an animal which costs them very little for its maintenance. Their deserts are filled with wild beasts, whose furs secure them from cold. Though the sun does not shine upon them, and they are enveloped in darkness, nature herself lights for them a torch, and the aurora-borealis faintly illumines their nights. And these very people consider their country as the most happy and extensive in the universe, whilst they regard us with as much pity and contempt as we can possibly feel for them.

Thus every climate enjoys its advantages and disadvantages, and these are generally so equally balanced, that it is difficult to say which has the preference. Considering it in this point of view, there is no country upon the earth can be said to be more advantageous than another; whether the sun throws his rays upon it in a particular direction, or whether they are received obliquely, or whether eternal snows whiten the surface. In one place the conveniences of life are more abundant; in another, the variety of blessings is not so great; but to compensate for this, the inhabitants are less subject to temptations, to corroding cares, and piercing remorse; they do not experience many obstacles to their happiness, and this doubtless compensates for many enjoyments of which they are deprived. And of this we may be certain, that Providence has distributed to each country all that was necessary to the support and happiness of its inhabitants; every thing is suited to the nature of the climate, and God has provided by the wisest means for the wants of all his creatures

NOVEMBER XXI.

TRANSFORMATIONS IN NATURE.

Numerous transformations take place in nature; indeed it may be said, that every thing in the physical world, at one period or another, is metamorphosed. The figure of objects continually varies; certain bodies pass successively through the three kingdoms of nature; and there are compound substances, which gradually become minerals, plants, insects, reptiles, fish, birds, quadrupeds, and man. Every year millions of bodies blend together, and are reduced to dust. Where are the flowers which, during the spring and the summer, ornamented our fields and our gardens? One species has appeared, withered, and

given place to others. The flowers of March, and the modest violet, after announcing by their presence the arrival of spring, have yielded their place to the tulip and the rose. In the room of these we have seen others, till all the flowers have fulfilled their design. The same holds good with regard to man. One generation shows itself, and another disappears. Every year thousands of human bodies return to the dust from whence they were taken; and of these evanescent bodies others more beautiful are formed. The salts and the oils of which they were composed dissolve in the earth; the more subtile particles are raised into the atmosphere by the sun's heat, and mixing there with other matters, are dispersed in different directions by the winds, and fall down in rain and dew, sometimes in one place, and sometimes in another; whilst the grosser particles mix with the earth. The grass which is nourished by them grows up into long blades; and it is thus that the flesh of men, transformed into grass, serves as aliment to the flocks, whose wholesome milk is again converted to our own subsistence.

These continual transformations, thus operating in nature, are so many certain proofs that the Creator has designed that nothing should perish or be useless. The dust of flowers, used in the fecundation of plants, is only a very small part of what each flower contains; and that the superabundant portion may not be lost, bees are created, which make use of it to form their honey. The earth daily presents us with new presents, and it would in the end be exhausted, if what it gives was not in some way or other returned again.

All organized bodies suffer decomposition, and are at last converted into earth. During this dissolution, their volatile parts rise into the air, and are dispersed in every direction. Thus the remains of animals are diffused through the air, as well as through the earth and the water. All these particles, so dispersed, unite together again in new organic bodies, which in their turn will undergo similar revolutions. And this circulation, and these continual metamorphoses, which commenced with the world, will only terminate with its dissolution.

The most remarkable transformation, or at least that which interests us the most, is that in which we are immediately concerned. We know that our body was not once composed, and will not be so in the end, of the same number of parts as it is when in its greatest perfection. Our body, when in our mother's womb, was extremely small; it became much larger when we were brought into the world, and since then has increased to fifteen or twenty times the bulk it then had: consequently blood, flesh, and other matters, supplied by the vegetable or animal kingdom, and which formerly did not belong to our body, have been since assimilated to it, and are become parts of ourselves. The daily necessity of eating proves that there is a continual waste of the parts of which we are composed, and that this loss must be repaired by alimentary matter. Many parts insensibly evaporate; for since the experiments which a certain great physician made upon himself, it is ascertained, that of eight pounds of nourish-

ment necessary to support a healthy man in one day, only the fiftieth part is converted into his own substance; all the rest passing off by perspiration and other excretions. Hence also it may be inferred, that in ten years there will not remain many of the same particles that now constitute our bodies. And at length, when they shall have passed through all their different changes, they will be converted into dust, till the blessed day of the resurrection, when they will undergo that happy and final revolution that will place them in a state of eternal rest.

NOVEMBER XXII.

THE GREATNESS OF GOD IS PERCEPTIBLE IN THE LEAST THINGS.

He who loves to meditate upon the works of God will not only trace him in the immense spheres which compose the system of the universe, but also in the least bodies of insects, plants, and metals. He will find and adore the divine wisdom in the spider's web, as he would in that power of attraction which preserves the planets in their orbs. These researches are facilitated by the use of the microscope, which discovers to us new worlds, where we may admire in miniature much that will excite our admiration; and those who have not had opportunities of using these instruments will at least read with pleasure some account of microscopic objects.

Let us first consider the inanimate world. Let us observe the mosses and small herbs which nature produces in such abundance. How numerous are the subtile parts and delicate fibres contained in these plants! How diversified their form and appearance! How innumerable their species! Let us think upon the immense number of minute parts of which every body whatever is composed, and which may be separated from it. If a hexagonal body of an inch square contains a hundred millions of visible parts, who can calculate all the parts contained in a mountain? If a million globules of water can be suspended at the point of a needle, how many ought there to be in a spring, a well, a river, a sea? If from a lighted taper there are emitted in the space of one second more particles of light than there are grains of sand on the whole earth, how many ignited particles ought there to pass from a large fire in the space of one hour? If a grain of sand contains several millions of particles of air, how many must there be in the human body? If we can divide a single grain of copper into millions of parts, without arriving at the elements of matter; if odoriferous bodies can exhale fragrant particles enough to perfume the air at a great distance, without the body losing any thing of its weight; the human mind would require an eternity merely to reckon the prodigious number of these particles.

If we now pass to the animal creation, our views will be infinitely extended. During the summer, the air swarms with living creatures;

each drop of water is a little world, teeming with inhabitants; every leaf is a colony of insects; and every grain of sand serves as an abode to multitudes of animate beings. Every plant, seed, and flower, nourishes millions of creatures. Every person must have seen those innumerable swarms of gnats, flies, and insects, which collect together in a very small space: what prodigious hosts of them must then live, enjoy themselves, and multiply upon the surface of the earth, and in the immense extent of the atmosphere! How many myriads of insects, worms, and reptiles, must creep upon the earth, or be contained within its bosom! a number so great as to be known to God alone. How splendidly manifest is his power, when we think of the multitude of parts which form these little creatures, of whose very existence many men are entirely ignorant! Were we not assured of it by daily experience, could we imagine that there are animals which, being a million of times smaller than a grain of sand, have yet organs of nutrition, motion, and generation! There are shellfish so minute, that, seen through a microscope, they scarcely appear so large as a grain of barley; and yet they are living animals, with secure habitations, whose different folds and cavities form so many chambers. How very small is a mite; and yet, almost imperceptible as it is, seen through a microscope, it is found to be a hairy animal, perfect in all its limbs, of a regular form, full of life and feeling, and provided with all the organs necessary to it! Though this animal nearly escapes our perception, it possesses a multitude of parts much smaller: and what is still more wonderful, is, that the glasses which enable us to discover so many faults and imperfections in the most finished productions of men, only more plainly indicate the regularity and perfection of these minute creatures. How inconceivably fine and delicate are the threads of a spider! It has been calculated, that thirty-six thousand would not more than make the thickness of a thread of common sewing silk. Each of the six papillæ, whence the spider draws that glutinous liquor with which it forms its web, is composed of a thousand insensible pores, through which so many threads pass, so that each visible thread of the spider is composed of six thousand smaller ones.

Great as these wonders may appear, they are far short of those we should discover, were it possible to obtain glasses of greater magnifying powers; and even then we could never reach the limits of the creation, though our microscopes magnified objects many millions of times more than they now do. The more we contemplate the works of God, the more will the proofs of his power be multiplied. We are confounded by the two extremes of nature, the great and the small; and we scarcely know whether to admire the Creator most in the immense spheres which roll their orbs in the heavens, or in those minute productions which are almost imperceptible to our eyes.

Let us, then, henceforth regard the contemplation of the works of God as our most delightful employment. The trouble that we take in investigating them will be amply compensated by the pure and innocent pleasures which they will procure us. We shall have an

ardent desire awakened in our minds to arrive at those blessed regions, where we shall require neither microscope nor telescope to discover and to become acquainted with the wonders of God; where all his works will be presented to the eye in unveiled beauty, and where we shall distinguish in each object its relations, structure, and destination; where hymns of praise will be chanted by immortal spirits, in celebration of the Creator of the universe; and where all distinctions between great and little will be lost in one grand whole, that will fill our souls with joy, love, and admiration.

NOVEMBER XXIII.

GRADUAL INCREASE OF THE COLD.

The cold begins now to increase perceptibly. With the past month, much of the autumnal warmth has departed. It is already colder, and the shorter the days become, the more will the earth lose its heat. This we daily experience, and it requires only a slight degree of attention to discover in this arrangement the wisdom and goodness of God.

This gradual increase of cold is necessary to prevent the indisposition, and perhaps the total destruction of our body. If the cold that we experience during the winter months came suddenly with the commencement of autumn, we should be benumbed, and the suddenness of the change might be fatal to us. As it is, we are very liable to catch cold in the cool summer evenings; how, then, would it be, if we suddenly passed from the burning heat of summer to the piercing cold of winter? How mercifully has the Creator provided for our health and our lives in thus granting us, in those months which immediately succeed the summer, a temperature that gradually prepares our bodies to bear more easily the increase of cold? What would become of those animals whose constitution cannot bear a great degree of cold, if winter suddenly came without any previous preparation? The greater part of birds and insects would perish in a single night, and with them their eggs and their young: whereas, by the gradual augmentation of the cold, they have time to make the necessary preparations for their preservation. The autumnal months, which separate the winter from the summer, warn them to quit their abodes, and repair to warmer climates, or to seek out places where they may pass quietly and in safety the rough season.

It would be equally fatal to our fields and our gardens, if they were to be suddenly deprived of the summer heat: all plants, and particularly exotics, would inevitably perish; and the spring could no more yield us flowers, nor the summer fruits.

It is, therefore, but just that we should acknowledge in this arrangement the wisdom and the goodness of God; and not regard it as a matter of little consequence, that from the last days of summer to the

commencement of winter, the heat as gradually diminishes as the cold increases. These insensible revolutions were necessary, that we and all other creatures might be able to subsist, and that the earth might continue to open to us her rich stores. Let the presumptuous man, who so often dares to blame the laws of nature, only displace one single wheel in the vast machine of the creation, and he will soon have occasion to feel the injury he has done, and learn to his sorrow, that though he might disorganize the arrangements of nature, he could never amend them. Let us, then, receive it as a truth, that nothing is made without just reason; and no revolution happens without a sufficient preparation. All material events gradually succeed each other; all are preserved in the most regular order; and all take place exactly at the appointed time: order is the great law with which God rules the universe; and hence it is that all his works are so beautiful, invariable, and perfect.

If it was our constant occupation to study this beauty and perfection in the works of God, and to acknowledge in every season of the year the traces of his divine power and goodness, we should hear no more of those foolish complaints by which we dishonour our Creator; but we should ever find order, wisdom, and goodness, even in those productions where we only expected to discover disorder and imperfection; and we should say, from the fullest conviction, 'All the paths of the Lord are truth and mercy; all his conduct towards his creatures love and kindness; and may we ever revere his covenant, and cherish his precepts.'

NOVEMBER XXIV.

SNOW.

During winter we frequently see the ground covered with snow. Every body observes it fall, but very few people give themselves the trouble to inquire into its nature and uses. Such is too generally the case with those objects which daily come under our notice, and from which we derive very considerable advantages. Often, indeed, the very things most deserving of our attention are those which we chiefly neglect. Let us henceforth be more rational, and begin by devoting some moments to the consideration of snow.

It is formed by very subtile vapours, which being congealed in the atmosphere, fall down in flakes more or less thick. In our climates these flakes are pretty large; but we are informed, that in Lapland they are sometimes so small as to resemble a fine dry powder. This is doubtless caused by the extreme cold which prevails there; and it is also remarked, that in our own country the flakes are greater in proportion as the cold is less severe, and they become less when it freezes strongly. The little flakes generally resemble hexagonal stars; sometimes, however, they have eight angles, and at others ten, and some of them

have an irregular shape. The best way of observing them is to receive the snow upon white paper: hitherto, little has been said of the cause of these different figures. The whiteness of snow may be thus accounted for: it is extremely light and thin, consequently full of pores, and these contain air: it is farther composed of parts more or less thick and compact; and such a substance does not admit the sun's rays to pass, neither does it absorb them; on the contrary, it reflects them very powerfully, and this gives it that white appearance which we see in it.

Snow, as it falls, is twenty-four times lighter than water, which may be proved by melting twenty-four measures of snow, and they will be found to produce but one of water. Snow evaporates considerably, and the greatest degree of cold does not obstruct this evaporation. It has been doubted whether snow ever falls at sea; but those who have navigated the northern seas in winter affirm that they have there seen much snow. It is well known that high mountains are never entirely without snow; and though a small portion of it is sometimes melted, new flakes soon replace it. The air being much warmer in the plains than it is on the mountains, it may rain on the one while it snows on the other.

Snow has several uses. As the cold of winter is much more destructive to the vegetable than to the animal kingdom, plants would perish if they were not preserved by some covering. God has then designed that the rain, which, during the summer, descended to refresh and reanimate the plants, should fall in winter like soft wool, to cover and protect them from the injuries they must otherwise have sustained from the frost and the winds. When the snow melts, it becomes a fruitful moisture to the earth, and at the same time washes away from the winter seeds and plants every thing that might prevent or injure their growth; and any superabundance of melted snow that then remains, goes to supply the rivers and springs that suffered during the winter.

These reflections may suffice to convince us of the goodness of God manifested in the meteor of which we have just treated; and let us raise our hearts in joy and gratitude to that beneficent God, who even from clouds and snow pours down blessings and abundance upon the earth.

NOVEMBER XXV.

SLEEP OF ANIMALS DURING THE WINTER.

Nature being deprived of so many creatures, which in summer rendered her lively and cheerful, now appears gloomy and dead. Most of the animals which have disappeared are buried during the winter in a profound sleep. This is the case with caterpillars, May-bugs, ants, flies, spiders, snails, frogs, lizards, and serpents. It is an

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erroneous supposition that ants lay up a store of provisions for the winter; the least cold benumbs them, and they continue in a state of torpescence till the return of spring: of what use, then, would be magazines, since nature has prevented the necessity of their having food in the winter, and it is not very probable that they should lay up stores for other animals. That which they so carefully collect during the summer does not serve them for their subsistence; they make use of it in the construction of their habitations.

There are many birds which, when food begins to grow scanty, conceal themselves in the earth, or in caverns, where they sleep during the winter. It is certain, that at the beginning of winter the swallows which dwell near the seashore, and banks of rivers, hide themselves in the earth, and the wall swallows in the hollows of trees, or in old buildings; and the house, or common swallows, seek the bottom of lakes and ponds, where they attach themselves in pairs, and clinging to reeds, remain there, seemingly without life or motion, till the return of warm weather reanimates them.

There are also some quadrupeds which, at the close of summer, bury themselves in the earth. Of these, the most remarkable is the marmot, or mountain-rat, which generally lives on the Alps. Though it delights in the highest mountains, in the regions of ice and snow, it is yet more subject than any other animal to the benumbing influence of cold. Hence it is, that the marmots retire about the end of September, or the beginning of October, into their subterranean abodes, where they continue till the month of April. Much art and precaution is observed in the arrangement of their winter habitation. It is a kind of gallery, the two wings of which have each a particular opening, and both terminate in a place where there is no outlet; and here they dwell. It is lined with hay and moss. These animals do not lay up provisions for the winter, because they do not require any. Before entering into their winter-quarters, each of them very carefully prepares for itself a bed with hay and moss; and then, after having exactly closed both the entrances into their retreat, consign themselves to sleep; and as long as they remain in this state they do not eat any thing. At the beginning of winter they are so fat, that some of them weigh nearly twenty pounds; but they gradually become thinner, and towards spring are very lean. When they are discovered in their retreats, they are found rolled up like a ball enveloped with hay; and during their torpid state they may be carried away without their awakening, and even be killed without their appearing to feel.

Bears eat prodigiously at the beginning of winter: they are naturally fat, and at that time are still more so; and it is by this exuberance of fat that they are enabled to endure their long abstinence during their repose in winter. Badgers prepare themselves for their winter's repose in the same manner, before they enter their retreat.

The instinct of these, and other animals, thus teaches them how to live so long a time without nourishment. From the first winter, and before experience has informed them, they foresee and prepare for their long sleep. In their quiet retreat they neither experience

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want, hunger, nor cold, and they know no other season than summer. Thus the wisdom and goodness of God has provided for the wants of all his creatures, and this he effects by a thousand different means which human intelligence cannot conceive; and from all this we may safely conclude, that as he watches over and preserves every one of his works, he will also condescend to guard us from danger, and preserve us from all evils.

NOVEMBER XXVI.

USE OF STORMS.

During this stormy season of the year, perhaps some discontented people may regard winds and tempests, which are now so frequent, as the disorders and scourges of nature; they do not consider the advantages which result from them, nor that without them we should be a thousand times more unhappy than we really are. Storms are the best means of purifying the atmosphere. To be convinced of this, we have only to pay attention to the weather which prevails in this season. How many thick and unwholesome fogs, rainy, dark, and cloudy days, are we subject to! Storms are chiefly instrumental in dispersing these noxious vapours, and by thus driving them from us are very beneficial. The universe is governed by the same laws as man, whom we may compare to a little world. Our health in a great measure consists in the agitation and mixture of our different humours, which otherwise would grow corrupt. And so it is with the world. That the air may not become injurious to the earth and to animals, it requires to be in a continual agitation. This is effected by the winds; not, however, those that are gentle and light, but by storms and tempests, which collect together vapours from different countries; and forming one mass of the whole, thus blend together the good and the bad, correcting one by the other.

Storms are also useful to the sea; if it was not frequently agitated with some degree of violence, the stagnation even of salt water would occasion a degree of putrefaction, not only destructive to the numerous shoals of fish which live in it, but also the sailors who float upon its surface. Motion is the soul of all nature, preserving every thing in order, and preventing destruction; and the sea, which contains so much animal matter, is not exempted from the general rule; for were it not constantly agitated, its waters would become putrid, and cause a general plague. Motion is as necessary to the sea as the circulation of blood is to animals; and those causes which only produce a gentle, uniform, and almost imperceptible agitation, are not sufficient to purify the whole mass. Storms alone can produce this effect, and the great advantages that result from it, not to men only, but to many millions of other creatures.

These, then, are some of the uses which we derive from storms,

and they are sufficient to prevent our regarding them any longer as destructive scourges and instruments of wrath. There is nothing in nature which has not its inconveniences, and storms are sometimes very injurious to individuals; but the evils they occasion are slight and partial, compared with the general good that they produce; and we must acknowledge God has arranged every thing with wisdom, and that we have abundant cause to be thankful for the present constitution of things. Happy are they who are convinced that every thing in the universe relates to the general good of all living creatures; that the evil existing in the world is compensated by numberless advantages; and that the very means which Providence employs to prove and chasten his children are in themselves indispensable blessings, whose general effects abundantly recompense us for every evil that, in particular instances, may result from their operation.

NOVEMBER XXVII.

FORTUITOUS EVENTS.

Properly speaking, chance can produce nothing; for nothing can happen without some real and determinate cause. What is generally called chance is nothing more than the unexpected combination of several causes, which produce an effect altogether unforeseen. Experience teaches us that these sort of occurrences are frequent in human life. Unforeseen accidents may entirely change the fortune of men, and overturn all their designs. It should naturally seem as if the race should be to the swift, the battle to the strong, and success to the most wise and prudent: this, however, does not always happen; frequently an unforeseen accident, a favourable circumstance, an event which could not be guarded against, effect more than the combined efforts of power, of genius, and of human wisdom and prudence. How lamentable, then, would be the destiny of man, if an infinitely wise and beneficent hand did not rule over all events! If the fate of men, of families, and even of kingdoms, often depends upon circumstances which appear to us petty and trifling; and if we were desirous of withdrawing these events from the superintendence of Providence, we should at the same time deny that he has any influence upon the greater revolutions that take place in the world.

We daily witness the occurrence of accidents upon which our temporal happiness or misery in a great measure depends. It is evident that we cannot guard against these kind of accidents, because we cannot foresee them; and hence it follows, that these unexpected events, which are beyond the reach of our understanding, and of our precaution and prudence, must be under the especial direction of Providence. God in his wisdom and goodness leaves us more or less to ourselves, according as we have greater or less ability to conduct ourselves with propriety. In those cases where our power and abilities

can effect nothing, we may be assured that God will particularly watch over us for our good: in all other circumstances, the labour and industry of men must concur with the favour and assistance of Heaven; for we cannot expect Providence to act alone in any but unforeseen contingencies. As, then, in every thing that we call chance, we evidently discover traces of the wisdom, goodness, and justice of God, it is manifest that chance itself is subject to divine government; and then it is that the empire of Providence is most resplendent. When the beauty, the order, and the arrangement of the world fill us with astonishment and admiration, we conclude, without hesitation, that an infinitely wise Being must preside over it. What a much more powerful reason have we to draw the same conclusion when we reflect upon the great events that are produced by accidents which no human wisdom could foresee! Have we not a thousand examples, that the happiness and even the lives of men, the fate of empires, the issue of battles, the revolutions of kingdoms, and other similar events, often depend upon entirely unforeseen contingencies? An unlooked-for event may confound projects planned with ability and concerted with prudence, and may at once annihilate the most formidable power. It is upon a firm belief in the saving efficacy of Providence that our tranquillity and our hope are founded. However great may be the evils which surround us, however terrible the dangers that threaten us, God is able to effect our deliverance by a thousand ways unknown even to ourselves. The firm persuasion of this all-consolatory truth ought to raise in our minds the greatest reverence for our God, and induce us to seek him in all things, always lifting up our hearts to him, and placing in him all our confidence. The belief in this truth, also, ought to repress our pride, and particularly to inspire those who are in exalted situations with that religious awe which they should have for the Supreme Being, who possesses so many means unknown to them, by which he can shake or overturn that slender fabric of happiness which their arrogance has reared. Nothing is better calculated, than the consideration of this truth, to banish from our souls all distrust, anxiety, and discouragement, and to raise in us a pure and holy joy. 'The infinitely wise Being has a thousand wonderful ways unknown to us, ways of mercy and love; and all his dispensations are regulated by justice and wisdom. He wills the happiness of his children, and nothing can prevent it; he commands, and nature obeys his voice.'

NOVEMBER XXVIII.

THE MAJESTY OF GOD.

It is extremely difficult to form any idea of God at all worthy of his majesty and greatness. The attempt, however, should be made; nothing contributes more to dignify and improve our nature than such

reflections. It is true, that it is as impossible for us to comprehend him perfectly, as it is for us to hold the sea in the hollow of our hand, or to grasp the heavens with a span. He is at once known to us, and concealed from us; he is near us, and at the same time infinitely above us: known and near, with respect to his existence, though infinitely elevated and hidden as to his nature, perfections, and decrees. On this account it is our duty to apply ourselves to know his greatness, as it is essential for us to conceive those sentiments of veneration which are justly due to him. To assist our weakness in this respect, let us compare God with what men esteem and admire the most, and we shall find that he is infinitely above all.

We may admire the power of kings, and be filled with astonishment when we hear of their conquering vast empires, taking cities and fortresses, erecting superb buildings, and making the happiness or the misery of whole nations. But if we are struck with the power of a man who is but dust and ashes, and whose exploits are due to other agents, how much ought we to admire the power of God, who has established the earth, and founded the heavens, who rules the sun, and sustains the immense fabric of the universe! We are justly astonished with the heat of the sun, with the impetuosity of the winds, the roaring of the sea, the rolling of the thunder, and the rapidity of the lightning; but it is God who imparteth to the sun his fires, who thunders in the clouds, who uses the winds as his messengers, and sendeth forth the red lightnings as his ministers, and who raises and calms the waves of the sea.

We justly respect those who have distinguished themselves by the extent of their genius, and the depth of their knowledge; but what is the understanding, what are all the faculties of men, compared with the wisdom of that Great Being, whose eyes penetrate through every covering, who numbers the stars of heaven and the sand of the sea, who knows the destination of each drop of rain as it falls from the clouds, and who at once sees and comprehends the past, the present, and the future; all of whose works are infinitely great, surpassing human conception.

We may be dazzled with the splendour of riches, and admire the gorgeous palaces of kings, the magnificence of their furniture, the richness of their garments, the beauty of their apartments, and the lustre of gold, silver, and jewels, that glitter in lavish profusion: but how pitiful and contemptible are all these, compared with the riches of God, whose throne is heaven, and whose footstool is the earth! He has formed dwellings for all creatures, and established provisions for all men and all animals; his meadows nourish the cattle, and all that is useful or excellent in the world is drawn from his treasures. Life, health, riches, glory, honour, and pleasure, are all in his hand, and he distributes them to whom he pleases.

We respect the princes of the earth, who command numerous subjects, and rule over several countries; but what is that speck of earth which is subjected to them, compared with the empire of the universe, of which our whole globe is but a small province; an em-

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pire that extends over all the stars of heaven, and their inhabitants; an empire whose Lord has all the sovereigns of the universe for his servants, and around his throne the cherubim and seraphim, ever ready, with wings outspread, to execute his orders?

We judge of the greatness of men by their actions and their works; and we celebrate kings who have built cities and constructed palaces, who have governed well their states, and have successfully executed great enterprises: but what are the works of the Most High? The creation of the universe; the preservation of so many creatures; the wise and just government of innumerable worlds; the redemption of mankind; the reward of the good, and the chastisement of the wicked.

Who is like unto thee, O Lord? Thou art great, thy name is celebrated; and t y works proclaim thy grandeur! Should not a religious awe possess our souls at the thought of the presence of the world's Eternal Ruler, the God whose glory ever encompasses us? The splendour of the stars fades in the presence of the sun; and so all the glory, wisdom, and power, all the riches and honours of the world, are eclipsed by the radiance and majesty of God! Our soul is exalted and enlarged by meditating upon the greatness and excellences of the Most High, and all our spiritual faculties are rejoiced by such sublime meditations; and our hearts penetrated with joy, veneration, and gratitude, when, in a holy transport, we represent to our minds the Being of beings, the Eternal, Almighty, and Infinite God; to whom be all glory, honour, and praise, for ever and ever!

NOVEMBER XXIX.

MOTIVES FOR CONTENTMENT.

Let our souls enjoy sweet contentment, for God is good; mercy and love shine through all his works. Let us contemplate his mighty deeds: the world, and all that it contains, announce his glory; all that he has created is worthy of him alone.

The heavens and the earth are proofs of his power; the sun who rules the day, and the moon who rules the night; every thing endowed with life and motion exalt the mighty God.

Consider the works of his hands: men and brutes show his infinite power; even the smallest objects, the blade of grass, and the grain of dust, teach us the knowledge of the Most High.

Ask the mountains and the valleys, the heights of heaven and the depths of the ocean, the winds and the storms, the reptiles that crawl in the dust, and they will proclaim his infinite wisdom and boundless power.

How shall we celebrate and adore that God who has given us life and being? Our bodies, and the souls which animate them, are the

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gifts of his hand; and let us, whilst we have a being, bless his holy name.

Objects of his guardian care during the day: each morning witnesses that he has watched over us through the darkness of the night. Every moment that glides away invites us to bless him who is the light and strength of our life.

Are we in adversity, and oppressed by trials and sufferings; scarcely have we felt the weight of our affliction, when our merciful Protector enables us to support them; his victorious arm is stretched forth to assist us, and all our difficulties vanish.

Let us never forget this, nor indulge the fear of being abandoned by God, who loves all his children; and may we ever submit to his holy will, and bless all his dispensations; convinced that he will accomplish his merciful designs, for he is omnipotent in counsel, and abundant in means.

NOVEMBER XXX.

GRATEFUL REMEMBRANCE OF PAST MERCIES.

Almighty God! thou art the common Father of all the generations which dwell on the earth; thou art my Father also. May I feel myself entirely dependent upon thee, not only for my existence, but also for every thing that I possess. I bless thee, and give thee thanks, for the life which thou hast given me, and for all the mercies which thou hast granted me to the present hour.

I bless thy providence for the endearing ties of my family, and for all the comforts and pleasures that I enjoy in domestic life.

I am thankful for the life and health which I enjoy, for the abundance of my food and raiment, and for the conveniences of my habitation. I thank thee for the success thou hast given to my enterprises, and the labours of my vocation; for all the blessings that thy bountiful hand has daily conferred upon me, and for every thing that has contributed to my preservation and happiness.

I ought also to bless thee, because, when thou at any time didst permit adversity and affliction to visit my habitation, thou didst not leave me hopeless, or without consolation. In the midst of my trials, and the just chastisements which, for my good, thou hast sometimes been pleased to inflict upon me, thou didst not abandon me; but didst soften and render mild the corrections which I suffered, and didst vouchsafe me thy favour and heavenly regard. Thy paternal hand has always guided me, and thou hast rejoiced to do me good.

From the experience which I have had of thy goodness, I will feel a confidence in thee, and commit into thy hands all my concerns and interests; and I will dare to hope, that long as it shall please thee to continue the thread of my life, thou wilt continue to watch over me, and, as far as thou deemest it consistent with my real happiness, wilt

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preserve me from all the evils and accidents that would disturb my repose. Grant, then, O Lord, that I may enjoy with a wise and grateful heart the favours that thou bestowest upon me; that in prosperity my soul may aspire after thee, the Author of all good; and that if thou hast decreed, in the impenetrable counsels of thy wisdom, that I should experience affliction and disappointment, I may submit with unfeigned resignation to all thy dispensations; and glorify thee to the utmost of my ability, whether basking in the sunshine of prosperity, or stemming the rough tide of adversity.

DECEMBER 1.

HYMN OF PRAISE.

When I reflect upon the unmerited mercies which I have received from thy hands, O Lord, my soul is astonished, and lost in admiration. Overwhelmed with thy goodness, my heart swells with joy, and I am unable to express the transports of my gratitude.

While yet asleep, unconscious of life in my mother's womb, thy guardian cares watched over me; and when I first drew my breath, thou didst incline thy ear to my infant cries; my tender lips could not then utter thy praises, and thou didst condescend to listen to my feeble accents, before they were formed into prayers: and when, in the thoughtlessness of youth, my steps wandered far from the path of virtue, thy merciful goodness recalled me to a sense of duty.

In danger, and in distress, thou hast ever been my rock and my fortress; and hast often preserved me from the snares of vice, the most dangerous of all enemies.

When death hovered over me, and a morbid paleness was diffused over my countenance, thou didst rekindle the almost expiring lamp of life; and when the recollection of my past sins imbittered my soul, thy grace afforded me consolation and support.

Blessed be thy name, who hast loved me so well; who hast bestowed on me the sweets of friendship, and the ties of affection? Thou hast granted me the greatest blessing that the mind of man can conceive, for which this heart, entirely consecrated to thee, desires to exalt thee: the greatest good which can be enjoyed on earth, gracious God, thou hast given me—the permission to approach thy throne, to celebrate thy mercy, and to glorify thy adorable name.

In my fears and in my distresses, in my dangers and tribulations, I will confide in thy mercy alone; and, supported by thee, death will lose all its terrors.

When the heavens shall pass away with a mighty noise, and the fabric of the universe be dissolved, I will rise above the ruins, and bless the omnipotent arm that upheld me, amid the crash of a wrecked world. O God, eternity itself is too short to utter all thy praise!

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DECEMBER II.

ERA OF THE CREATION OF THE WORLD, AND OF THE HUMAN RACE.

If we fix the epoch of the creation of the world according to the testimony of the sacred writings, it has scarcely subsisted six thousand years. Those who suppose it to be of much more ancient date, are contradicted by reason and the monuments of history, which have escaped the dilapidations of time. The history of the human race does not go farther back than that which has been transmitted to us by Moses, for all else that has been said respecting the origin of ancient nations has been advanced without proofs; neither does it extend beyond the deluge. As to the chronological books of the Chinese, they are evidently filled with falsities. The Phenicians have no historian more ancient than Sanchoniatho, who lived after Moses. The Egyptian history does not go beyond Ham, the son of Noah; and the books of the Jewish lawgiver remain to be the most ancient, as well as authentic, of all the monuments of antiquity.

If we consider the arts invented by men, we shall find that few of them have been known more than two or three thousand years. Man, whose nature and reason give him an aptitude for the arts and sciences, is also stimulated to it by necessity, and the desire of obtaining conveniences and pleasures, and by his vanity and ambition, as well as by luxury, the child of abundance, which creates new wants. This has been evident among men in all ages. History informs us of the epoch when men had scarcely invented the most necessary arts, and when those which were known were very imperfectly understood, and when they were ignorant of the first principles of the sciences. Four thousand years ago, men were in a great state of ignorance with respect to most subjects; and if we calculate the progress that they have made since that period, and then go back to the remotest ages, we may, with some degree of certainty, determine the epoch when men knew nothing, or, in other words, that of the birth of the human race. If their existence was to be dated farther back, it would have been impossible that the most useful and necessary arts should have remained unknown, during a long series of ages. On the contrary, all that the human mind was capable of discovering would have been long since known; and from this circumstance we must then necessarily conclude, that the origin of the human race could have had no other era than that assigned by Moses in his history of the creation. It is absurd to suppose, that men, during the space of so many thousand years, should have remained enveloped in darkness, and plunged in a lethargic stupor, from which they suddenly awoke, and all at once invented different arts, and procured for themselves all the comforts and pleasures of life.

It may be also remarked, that the greatest part of Europe was formerly covered by immense forests, very few cities, towns, or villages, then existing; consequently, the number of its inhabitants must then

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have been much less than at present. Germany, for instance, was one continued forest; from which we may judge of the paucity of its inhabitants. Men, at first, could only cultivate the open spaces which were found in certain parts of the forest; they had no private property in land, and yearly changed their abode. In all Germany there was not a single fruit-tree; acorns alone were produced. If we wish to draw a parallel between the inhabitants of ancient, and those of modern Germany, we must separate those which dwell in cities and towns; pay attention to the numerous colonies that have emigrated from Germany; observe that most of the forests being now cut down, and the space they occupied converted into arable land, ancient Germany would then be found to contain scarcely a tenth part of the cultivated ground that it now does, and, consequently, but a tenth part as many inhabitants. How many millions of men were there less at that period than there are at present! and how abundantly must they have multiplied since! Yet the forests which extend from Germany to the north-east of Asia, and those still remaining in Africa and America, prove that our globe is not near so well peopled as it might be. The farther we penetrate into the remote ages of antiquity, the less shall we find the earth peopled and cultivated, till we reach the epoch of the origin of the human race.

It is, therefore, impossible that our globe should have been eternal; for if it had, it must have been as well peopled from time immemorial as it is at present.

DECEMBER III.

THE USE OF WOOD.

Though we derive very great and numerous advantages from every part of a tree, yet none of them can be compared to those which the wood itself affords us. Such is its abundance, that we might say God provides us every day with a fresh supply, that we might never be destitute of so useful a substance. It answers every purpose for which we design it; is pliant enough to be susceptible of any form in which we mean to mould it; firm enough to retain any shape it has once received; and being easily sawed, polished, and bent, we procure from it many conveniences and ornaments. These, however, are far from being all the advantages which we derive from wood, as most of them only contribute to the purposes of convenience or luxury. We have more indispensable necessities, which we could not supply if the wood did not possess a suitable degree of thickness and solidity. Nature, it is true, furnishes us with many hard compact substances; we have stones and marble, which we know how to adapt to different purposes. But it is troublesome, as well as expensive, to extract these from their quarries, to carry them to a distance, and to work them: whilst with much less expense, and less trouble, we can procure the

largest trees. Wooden piles, several feet long, forced into the earth, form a safe foundation for walls, which, without this precaution, would sink into the clay, or fall where the ground was sandy. They also support the most heavy and extensive buildings; and other pieces of wood sustain the stone-work, and the weight of the tiles, lead, &c. which compose the roofs of our houses.

Wood, in many provinces, is used as the chief article of fuel; and thus cheers the shivering natives in the long nights of winter, when the cold mists, and piercing north winds, would otherwise have chilled their blood. How necessary, then, is wood, as a part of the creation! and we now see that it was for the wisest purposes that the Author of the universe covered so large a portion of the earth's surface with forests.

Whilst reflecting on the comfort and warmth which wood affords us at this season of the year, we may thus address ourselves to God: 'Compassionate Father! this also is one of thy blessings: I receive it from thee with a lively sense of gratitude; and acknowledge thy providential care in providing for me the grateful warmth which cheers and invigorates my frozen limbs. Whether I endure the scorching days of summer, or feel the winter's piercing cold; in the open air, or in a warm apartment, thou art ever present, and ever my benefactor. Let me not forget thy mercies, nor regard even the firewood with indifference; but as in each season of the year I receive peculiar marks of thy goodness, may I never cease to bless and to glorify thee, and exalt thy beneficence.'

DECEMBER IV.

REMARKABLE PROPERTIES OF CERTAIN ANIMALS.

We daily enjoy a variety of advantages which we derive from animals. The Creator has given us some that live domesticated with us, and others for our sustenance; and all, in one way or another, are designed to minister to our necessities and pleasures.

The dog, independently of the beauty of his form, his strength, speed, and vivacity, has all those qualities which endear him to man. He possesses great sensibility, is much improved by education, and is every way worthy of our affection and regard. He knows how to promote our designs, watch for our safety, defend and caress us by turns; and by his assiduous services, and generous disposition, renders himself highly useful and agreeable to his masters. Without the assistance of this faithful servant we could not so easily subjugate other animals. In short, it seems as if God had given the dog to man for a companion and a guard. This very interesting animal merits still farther attention from his performing many actions, which prove that he is not merely a machine, but possesses some principle of intelligence. How expressive are the signs by which he manifests the

joy he feels upon his master's return? And how different again are those that he discovers upon the approach of a thief or an enemy, or when in full cry he pursues the hare, as she bounds over the plains!

The advantages which we derive from the sheep are still more considerable, though it has not the gift of pleasing like the dog. Every part of the sheep is useful to us; its milk, wool, flesh, and even its bones. A singular property observable in this animal is that of its chewing the cud, or ruminating: it at first swallows its food hastily, without sufficiently masticating it; and afterwards can again bring it into its mouth, re-chew, and swallow it a second time. This animal has but one row of teeth, which defect, however, is remedied by its having four stomachs. In the first of these, which is called the paunch, and is very large, the food is softened and moistened; in the second, named the cap, or hood, and which is much smaller, the food is farther macerated, and digestion begins to make some progress: from this it passes into the third stomach, called the millet, where it is retained till it is sufficiently dissolved; and digestion is finally perfected in the fourth stomach, called the rennet bag, in which the food changes its colour, and becomes white like milk, though in the third stomach it was green.

The hare possesses instinct for its own preservation, and sagacity to enable it to escape from its enemies; it makes its own form or bed, and in winter chooses those places which have a southern aspect, while in summer it prefers the north. It conceals itself in furrows, or by the side of hillocks, that nearly resemble the colour of its skin. When pursued by dogs, it darts rapidly forwards, then turns, and returns upon its steps, throws itself into some secret place, and after many leaps and doublings, hides itself in the trunk of a tree, or in some bush. It is cunning enough continually to change its place of abode as circumstances may urge.

The stag is still more wily and subtle than the hare, and often leads the huntsmen a much more arduous chase. The lightness and elegance of its slender and well-proportioned form; its branching horns, serving both for ornament and defence; its size, speed, and strength, distinguish it from all the inhabitants of the wood, the solitude of which it seems formed to embellish and to enliven.

When we reflect on these and innumerable other animals, we find more and more cause to acknowledge the goodness with which the Almighty provides for our support, our convenience, and our pleasures. Our globe is the habitation of innumerable animals, which are under our command, and exist for our comfort and sustenance. And if the soil of the earth is so diversified, it is only that a greater number of animated beings may find their provisions adapted to their different natures. All kinds of soil, good as well as bad, sandy or marshy, stony or moist, from the banks of rivers to the summits of mountains, are peopled with living creatures, which in one shape or another are indispensable to us. There is no place, however steril it may appear, that does not support some species of animals that are useful to us. And shall not man, thus indebted to the Father of mercy, acknow-

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ledge his goodness, and be grateful for his favours? Can he remain insensible to the many blessings he daily receives, or pass over with inattention those gifts of nature which he enjoys?

DECEMBER V.

FORMATION OF SNOW.

Snow is a species of hoar-frost; it differs, however, in this particular, that the hoar-frost falls in the form of dew, upon the surface of certain cold bodies which attract its moisture, and to which it adheres; whilst the snow, before it falls, is already formed in the upper region of the atmosphere by congealed vapours, which observe the same laws in falling as fogs, dew, and rain. The air is often very cold, and this may be increased to a considerable degree by the density of the atmosphere, and the accession of acid vapours. It is then very easy to understand how the aqueous particles become congealed. What, perhaps, contributes the most to give this freezing property to the air are the clouds; and generally every snowy day is also cloudy; and the thicker the clouds are, the more they interrupt the rays of the sun, and prevent their action; whence must naturally result a degree of cold great enough to make the vapours lose their fluidity, and convert them into snow. But, upon the same principle, ought it not sometimes to snow in summer? No doubt this may happen, and snow may really be formed in the superior regions of the atmosphere; but the cold in that season is never sufficiently strong to counterbalance the effects of heat reflected from the earth, which melts the congealed vapours as they approach the lower regions of the atmosphere; consequently they cannot then appear in the form of snow. This is far from being the case in winter; as it is then so cold in the lower regions of the atmosphere, and upon the surface of the earth, that the frozen vapours in falling can no longer receive a sufficient degree of heat to melt them.

It is a pleasing sight to contemplate the flakes of snow as they fall; in a few moments covering the whole surface of the earth, far as the eye can reach; and it admirably justifies what was said by the pious Brookes, when he told us that 'even snow has its charms, and winter its sweets. Pure and innocent pleasures may be enjoyed by all men, except those who, for want of cultivating their faculties, are become incapable of reflecting, and never regard the works of God.'

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DECEMBER VI.

WINTER PLANTS.

It is wrong to suppose that winter is generally destructive to plants and trees. So far from it, there can be no doubt that the variations of temperature contribute materially to the growth and propagation of vegetables. In very warm climates there are immense deserts, that would be much more steril if cold did not sometimes succeed to the burning heats. And winter, far from being prejudicial to the earth's fertility, promotes it. There are plants which thrive in the coldest countries, notwithstanding the ice and snow. Many trees, as firs, pines, junipers, cedars, the larch, and the box, flourish in winter as in other seasons. Houseleek, pepperwort, sage, marjoram, thyme, lavender, and wormwood, with many similar plants, preserve their verdure during the winter. There are even some flowers that spring up under the snow. The single anemone, the hellebore, the winter hyacinth and narcissus, the snowdrop, and various species of mosses, flourish, and are in flower during the cold. We are informed by botanists, that the plants of the frigid zone, being placed in greenhouses, could not bear a higher degree of heat than thirty-eight degrees; whilst they can support so great a degree of cold as to grow during the winter in Sweden, as well as most parts of France, Germany, and Russia, and the northern provinces of China. Vegetables which live in very cold climates cannot bear much heat, neither can those that grow on the tops of mountains. Rocks, and mountains capped with snow during the greatest part of the year, have yet plants peculiar to them. Many vegetables are found upon the rocks of Lapland, which are known also to grow on the Alps and the Pyrenees, on Mount Olympus, and the heights of Spitzbergen, but are no where else to be met with. When these are transplanted into gardens they grow to a considerable height, but bear very little fruit; and few of the plants which thrive in the northern countries will come to a state of perfection without snow.

Thus in the immense garden of nature there is no soil entirely barren, from the finest dust to the hardest rock; from the tropics to the frozen regions of the poles, there is no soil which does not produce plants peculiar to it; and no season is entirely destitute of these beautiful productions of nature, fruits or flowers continuing all the year round.

Grant, merciful Creator, that in this severe season thy children may not forget thy paternal regard, nor shut their eyes to the blessings which thou hast graciously condescended to bestow upon them; and permit, that, if thou art pleased to favour them with a length of years, they may, in the fulness of their days, and the maturity of their wisdom, bring forth fruit worthy of thee, and beneficial to their fellow creatures.

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DECEMBER VII.

EXHORTATION TO REMEMBER THE POOR DURING THE SEVERITY OF THE WINTER.

You who now are sitting at your ease in comfortable apartments, cheered by the fire's genial warmth, whilst the north wind blusters round your dwellings, reflect upon those unfortunate children of poverty who are suffering the accumulated miseries of cold, penury, and disease. 'Happy is the condition of those who, in this rigorous season, have a house to shelter them, and clothes to keep them warm; who are refreshed by wholesome food, and recreated by the juice of the vine; who, reposing on downy pillows, enjoy sweet slumbers and pleasing dreams. But miserable is the lot of those to whom poverty denies a shelter; who have no home, no clothing to defend their shivering limbs from the rude blast; who are unable to make their necessities known, and have not a friend to cheer their drooping spirits or sooth their afflicted souls with the consoling language of hope.'

I wish to awaken in the hearts of my readers a sense of the miseries to which the lowest classes of society are subjected. I call upon them to regard those pitiable objects, whose necessities, too importunate to be neglected, oblige them to intrude themselves upon the notice of the rich. How many poor creatures are seen feebly crawling along the streets, their countenances so haggard by wo, hunger, and cold, as scarcely to give the semblance of human nature! Men venerable in years, with scarcely rags sufficient to cover them, obliged to expose their hoary heads to the severity of the passing storm, whilst they humbly solicit the casual charity of the passenger! Others, labouring under disease, destitute of sustenance and the commonest necessaries of life, stretched on some miserable pallet, in cellars or garrets, where damp, cold, dirt, and vermin, are their only companions, are lingering out their hapless moments in anguish and hopeless despair!

Winter, by increasing all the wants of the poor, renders our charity to them doubly necessary and indispensable. It is a time when nature herself is wild and destitute, and surely by distributing our benefactions seasonably we very much enhance their value. If we have been enriched by the fruits of summer and autumn, is it not that we may be enabled to share these blessings with our less fortunate brethren, whilst nature is in a state of repose? As the cold increases, so should we be more disposed to administer unto the necessitous, and pour into the bosom of the distressed and the needy a portion of the comforts arising from our superabundance; and the affluent ought particularly to be thankful to Divine Providence, for having it in their power to imitate his blessed nature, by relieving the necessities of the poor: and what nobler end can be answered by the unequal division of fortune, than that of the wealthy feeling for, and relieving the miseries of, their less favoured brethren?

Let those, then, who enjoy the gifts of fortune, compassionate the

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sufferings of the poor, and learn that it is their duty, and noblest privilege, to feed, to clothe, to warm, and to console the distressed; to dissipate their heart-corroding cares, and snatch them from the cold embrace of death. Let those who taste the sweets of independence, and revel in the pleasures of luxury, impart a portion of their superfluous abundance; and let those whose resources are less exuberant still give a part, remembering that there are few people who have any title to respectability of character, however limited their income, who have it not in their power to do some good. Let us, then, enjoy that delightful gratification which the noble heart ever feels, the divine pleasure of relieving the wants of our brethren, of tempering to them the rigours of winter and the keenness of adversity. Who can deny himself the consolation of raising a fellow-being from the bed of sickness and the depths of misery, which he may often effect with ease, by retrenching some unnecessary ornament in dress, or curtailing himself of some pleasurable extravagance? And what more grateful incense can be offered up at the shrine of virtue, than beneficence exerted on behalf of suffering humanity, by a victory over our passions, or retrenching some expense in luxury or vanity, in order to apply it for the good of the poor?

DECEMBER VIII.

NATURE IS A SCHOOL FOR THE HEART.

The study of nature, in every point of view, is profitable; and it may very properly be termed, a school for the heart, since it clearly teaches us the duties we owe to God, to ourselves, and to our neighbours.

Can any thing inspire us with a deeper veneration for the Supreme Being, than the consideration that it is he who not only has formed the globe of the earth out of nothing, but who has suspended it in the vast regions of space, with all the creatures which it contains; that it is his all-powerful hand that retains the sun in his orb, and the sea within its confines? And can we humble ourselves too much in the presence of a Being who has created all those numberless worlds which revolve around us? What diminutive creatures are we compared with those immense globes! and how little does the earth and all its glory appear, when considered under this point of view! And do we not shudder at the very thought of offending that God whose boundless power is every where manifested, and who in an instant can wither all our boasted strength, and render nought our most brilliant enterprises?

The contemplation of nature is particularly conducive to inspire in us the emotions of love and gratitude for its Divine Author. All nature loudly proclaims the consoling truth, that God is love. It was love that induced him to manifest his glory by the creation of the

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world, and communicating to other beings a portion of that felicity which he himself enjoys. For this purpose he created the universe, and an innumerable multitude of creatures, that all, from the first link to the last, from the archangel down to the lowest reptile that crawls in the dust, should experience, each according to its nature and capacity, the effects of divine goodness. Is there a single creature existing throughout the vast regions of created nature which does not afford proofs of this heavenly truth? Man more especially displays its certainty and divine operation, inasmuch as the Creator has not only endowed him with reason, more eminently to enjoy the blessings he receives, but also to enable him to feel and acknowledge that love which is the source of all the favours he enjoys. The Creator has given him dominion over all animals, to convert them to his use and conveniences; and for him he has made the earth produce her fruits in abundance. And ought not the many blessings which we daily receive, and without the continuance of which our existence must cease; ought not the disinterested love of that great Being, who can derive nothing from his creatures, and whose felicity is perfect, to affect our hearts in the tenderest manner, call forth our gratitude, and engage us with irresistible energy to return the love of our beneficent Creator? The contemplation of the universe, and the perfections of God so clearly manifested, should naturally increase our confidence in his power and mercy. And how great ought our tranquillity to be, knowing that we are superintended and directed by a Being, the proofs of whose wisdom, power, and goodness, we have continually before us in every part of the creation! What, then, in the hour of trial, of difficulty, and of danger, shall discourage us from offering up our prayers to him who has stretched out the heavens, and formed all living creatures?

Is it possible that base and selfish principles can actuate the heart of a man, who, in contemplating nature, every where discovers traces of the infinite beneficence of God, who does not propose less the felicity of every individual than the universal good of the whole creation? No one can, for a moment, reflect upon the ways of Providence, without being sensibly touched by his goodness and tender cares for every living creature; and the heart which is not incited to imitate this universal benevolence, must be depraved and callous to a degree that makes us shrink with horror at the thought of its ever existing in a human breast. Does not God make 'his sun to rise on the evil, as on the good, and send his rain on the just, as on the unjust?' Let us, then, learn charity on that extensive and liberal scale, which knows no bounds but those which the Omnipotent has set to the human capacity. If we desire to imitate our heavenly Father, we must endeavour to raise in our bosoms a spark of that celestial love whose cheering warmth diffuses its comforts wherever we go; and the more we impart of it to others, the brighter is its radiance, ever inextinguishable.

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DECEMBER IX.

THE GOODNESS OF GOD MANIFESTED TO MEN, EVEN IN THOSE THINGS WHICH APPEAR TO BE HURTFUL.

It is very usual for men to wish that they were not exposed to any evils. If they had the power of choosing, and could regulate at pleasure their condition in life, they would endeavour to obtain one that should be exempt from all manner of trouble and affliction. But it is a question whether we should be really happy, if nothing ever happened to disturb our repose and well-being; or if the course of our lives was to continue in one uniform calm, unruffled by the vicissitudes of disagreeable occurrences. This question, upon the decision of which much of our tranquillity in this state of existence depends, is highly deserving our attention, taking care, at the same time, to avoid the delusions of self-love.

Should we really be happy if we were in this world to enjoy uninterrupted prosperity? I cannot think we should. Constant prosperity would soon become insipid, and disgust would convert our felicity into absolute misery. On the contrary, the evils we sometimes experience enhance the value of our blessings, as colours are relieved by the contrast of shades. If no winter preceded, should we be so sensibly affected by the pleasures of spring? Without illness, could we justly appreciate the value of health; or taste the sweets of repose without toil and labour? And could we know to their full extent the peace and consolation of a good conscience, if we had never experienced the trials of temptation, or the pangs of remorse? The more obstacles there are to oppose our happiness, the greater is our joy when we have surmounted them. The more sensibly we feel the weight of misery and oppression, the greater is our happiness when we are delivered from our burden. Besides, if the misfortunes of which we so much complain did not sometimes befall us, we should be exposed to evil of much greater importance. If we lived in one continued round of prosperity, we should abandon ourselves to pride, luxury, and ambition. If we never knew the misery of dependence, and the wretchedness of want, we should have no stimulus to exertion, nothing to rouse us to action; no one would exercise his talents, or cultivate his faculties, and no one would be animated with zeal for the public good. If we were never exposed to danger, how could we learn prudence, or experience the sentiments of compassion for those whose life is in danger? If we had no misfortunes to fear, how liable should we be to forget, in the intoxication of prosperity, our gratitude to God, charity for our neighbour, and all the great duties of life? And are not these virtues and noble qualities of the soul infinitely preferable to a continued succession of sensual pleasures, which, when they are no longer stimulating by their novelty, produce satiety and disgust? 'He who continually reposes on the bosom of prosperity, soon becomes weary of exerting himself for the benefit of others, and incapable of any great

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action; but when adversity opens his eyes to his real state, he will return to wisdom, activity, and virtue.'

How foolish and unjust are the desires of men! They wish to live quiet, contented, and happy, and they are dissatisfied with the means which will conduct them to the haven of their desires. During the heat of summer we sigh for cool breezes, and yet are troubled when we see the storm that will procure them begin to threaten. Thunder purifies the air, and fertilizes the earth; and yet when it awfully rolls among the clouds, we complain of the fear that possesseth our hearts. We acknowledge the utility of coals, sulphur, and minerals, but dislike earthquakes. We are desirous that there should be no contagious and epidemic disorders, and yet complain of the tempest which, by purifying the air from corruption, takes away one of the chief causes producing them. We wish to be served by domestics, and yet are unwilling that there should be in the world either poverty or inequality of rank. In short, we desire to have every end accomplished, without suffering the necessary means.

Acknowledge, then, O man, the wise and beneficent views of thy God, even when he permits thee to be tried by the frequent vicissitudes of joy and of sorrow, of happiness and of misery. Is he not the arbiter of thy lot, the Father, of whose merciful goodness thou must be convinced even when suffering chastisement? Art thou not in a world, the peculiar characteristic of which is to be subject to continual changes and revolutions? And hast thou not often found, that what thy ignorance disposed thee to regard as an evil has, in the end, contributed to thy happiness? Let us, then, receive with humble resignation those afflictions which it shall please the Almighty shall be dispensed unto us. They will only appear to be formidable in the beginning; the more we shall be exercised by them the more supportable will they be, and the more shall we know their salutary effects. If in adversity we are full of faith, patience, and hope, we shall have cause in the end to bless God for his trial of our nature.

DECEMBER X.

ACCIDENTAL REVOLUTIONS OF OUR GLOBE.

Nature of herself is continually producing changes upon the surface of the earth, which have a great influence upon the whole globe. Many ancient monuments prove that in different places the surface sinks down at one time gradually, at another suddenly. The wall that the Romans built in Scotland, in the second century, quite across the whole country, is now almost entirely buried under ground, and remains of it are frequently discovered. Mountains, those pillars of the earth, are exposed to similar changes, occasioned either by the nature of the soil, by water sapping their foundations, or by subterranean fires. Though some parts of the earth sink down, others, on

the contrary, are elevated. A fertile valley may, at the end of a century, be converted into a marsh, where clay, turf, and other substances, may form strata from each other. Lakes and gulfs are converted into dry land. In stagnant waters, weeds, rushes, and different plants grow; substances, both animal and vegetable, putrify in them, and gradually form a sort of mud or mould, till at length the bottom becomes so much raised, that the place of water is occupied by solid earth. The sea also partakes of the commotions occasioned by earthquakes and explosions, and the most sensible effect we observe from them is the formation of new islands. These are produced by the elevation of the bottom of the sea; or are composed of pumice-stones, calcined rocks, and other matters projected from volcanoes. History informs us, that in consequence of earthquakes, whole cities have been swallowed up, and buried sixty feet deep, so that the earth which covered them afterwards became arable ground.

Many of the alterations produced upon our globe have been occasioned by the motions of waters. Rain soaks into the mountains, and washes away a portion of their substance, which being carried into the sea and rivers, considerably raises their bottom. The course of water is often changed, and the coasts themselves are sometimes removed. At one time the sea retires, and leaves whole countries dry, which once were its bed; and sometimes it encroaches upon the shore, and inundates whole provinces. Places which formerly bordered on the sea are now at a considerable distance from it. Anchors, and large iron rings, to moor vessels, and the wrecks of ships, found on mountains and marshes, at a great distance from the sea, incontestably prove that many parts of the earth, now cultivated, were once covered by the ocean. It is a very probable conjecture that England was once united to France: the beds of earth and stone, which are the same on each side the strait, between Dover and Calais, as well as the shallowness of the sea between those two places, render it still more likely to have been the case.

Climates also occasion great revolutions upon the globe. Between the tropics, heats and rains alternate; in some places it rains for several months successively, and at other times the heat is excessive. The countries situated near the poles are exposed to great changes by the rigour of the cold. In autumn the water penetrates by numerous crevices into the rocks and mountains, and in winter freezes, when the ice, by its dilating, causes great destruction.

Hence we learn that all mundane things are subject to change and continual vicissitudes; and we see that frequent accidental revolutions give place, to cause the animate as well as the inanimate world to assume a new appearance. One generation departs to give place to another. Among men, some rise into notice and respectability, whilst others sink into poverty and insignificance; and, among the various creatures that inhabit the globe, there are evident differences in their states and faculties. God has allotted to all beings different periods of duration: some have only a short and momentary existence, others a

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long life, and others an endless duration; all evincing, in the most striking manner, the wisdom, power, and goodness of the Creator.

DECEMBER XI.

GRATITUDE FOR OUR CLOTHING.

Providence manifests his care even in our clothing. How many animals furnish us a covering with their skin, hairs, furs, and wool! The sheep alone supplies us with the most necessary part of our dress; and to the labours of a worm we are indebted for our silken robes. How numerous are the plants which also contribute to our dress! Flax and hemp also supply us with linen; and with cotton various articles of apparel are manufactured. But these vast stores of nature would still have been deficient, if God had not endowed man with industry, and a mind inexhaustibly fertile in invention, as well as hands suitable to prepare the different kinds of clothing that are necessary. If we only reflect upon the labour requisite to prepare a single piece of cloth, we shall find how many hands are necessary to procure even a few yards. We surely ought not to be vain of our garments, seeing that to obtain them we are obliged to have recourse to those animals that are the most contemptible in our estimation, and to that class of men that we the most despise.

Why has the Creator obliged us to provide ourselves with clothes, whilst all other animals receive theirs immediately from nature? In answer to this, I assert, that this necessity is very advantageous to us; it is favourable to our health, and suitable to our mode of living. We may by this means regulate our dress according to the season of the year and the climate in which we live. Our clothes promote the insensible perspiration of our bodies, so essential to the preservation of our lives; and the obligation that we are under of procuring them has exercised the human mind, and given rise to several arts; and, finally, the labour which they require for their fabrication supports a great number of workmen. We have, therefore, every reason to be satisfied with this arrangement of Providence; only let us be very careful not to lose sight of the end proposed in our being supplied with clothing. A Christian certainly should not seek to derive his glory from the external covering of his body, but in the virtuous dispositions of his soul. Pride assumes various forms; it is elated by the most trifling advantages, and seeks for applause where none is merited. Pride is manifested by some people in the brilliancy of their silks and the splendour of their jewels, whilst others nourish it in rags. The man who studies propriety will avoid either extreme. To glory in outward ornament and external pomp is degrading to our nature; we wear clothes to preserve us against the intemperance of the air, and not to gratify the pettiness of vanity, and the insignificance of pride.

Let us also reflect a little on the state of many of our fellow-crea-

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tures, who have scarcely clothes to cover them. How many poor wretches do we see around us half-starved and half-naked, who in these severe winter days can find no shelter from the cold! Let the contemplation of these unfortunate beings induce us to feel a lively sense of the divine goodness, which has enabled us to obtain the necessary clothing. Let us, then, remember that many people are destitute of what we so abundantly enjoy, and that it is our duty to clothe the naked, to feed the hungry, and be grateful to God for the plenty with which he has blessed us.

DECEMBER XII.

COVERING OF ANIMALS.

It is an incontestable proof of Divine Providence, that all animals are naturally provided with that covering which is best adapted to their place of abode and mode of living. Some are clothed with hair, some with feathers, several with scales, and others with shells. This variety is a certain proof that a very skilful workman has prepared the garments of these animals; for they are not only generally adapted to the different species, but also appropriated to each particular individual. For quadrupeds, hair was the most suitable covering; and nature in giving it to them has so formed the texture of their skin, that they are hardy enough to lie down upon the ground in all kinds of weather, and be employed in the service of man. The thick fur of some animals, whilst it secures them against the effects of cold and moisture, serves them also to cover their little ones, and to lie down more softly.

For birds, and some species of insects, feathers form the most convenient covering: besides sheltering them from cold and wet, they are so arranged as to enable them to float more easily upon the air. Feathers cover the whole body of the bird, and by their delicate structure favour its flight; they are light and hollow, and their quills contain a marrowy substance which strengthens them, while capillary filaments, interlaced into each other with much art, render them sufficiently thick to maintain the heat of the body, to preserve it from the inclemency of the weather, and to give the wings a sufficient degree of strength.

The covering of reptiles is also perfectly adapted to their mode of life. Let us examine, for instance, an earth-worm. Its body is formed of a series of small rings, and each ring is provided with a certain number of muscles, by means of which it can extend or contract its body at pleasure. They have under their skin a glutinous juice which exudes, and whose effect is to lubricate the body, that it may with greater facility make its way in the earth.

Aquatic animals are covered by a substance equally well adapted to the element in which they live. Fish could have no dress so con-

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venient for them as scales; the shape, hardness, size, number, and position of which are admirably adapted to their mode of life.

The beauty of these various kinds of covering is also very remarkable, particularly in some species of birds and insects. The varied hues of the butterfly, and the splendid plumage of some birds, are truly admirable; in some we see all the richness of colouring, in others the most beautiful and delicate simplicity. The hummingbird, a native of America, may be justly regarded as one of the wonders of nature: not larger than a bee, its plumage is so beautiful, that its neck and wings reflect the brilliancy of the rainbow. Its neck exhibits the bright red of the ruby; under the belly and wings the colour is that of gold; the thighs are green as the emerald: the feet and bill black and polished as ebony. The males have a small tuft upon their heads uniting all the colours that adorn the rest of their body, and which the Mexican ladies wear as pendants in their ears.

We find, then, that every animal has that kind of dress which is most suitable to it: nothing is defective, nothing is superfluous; but every thing is so well arranged and perfected, even in the smallest productions of nature, that human industry and art can never imitate it. And does not this clearly demonstrate the existence of a Being, who unites infinite wisdom and goodness to a desire of rendering each creature as happy as his nature and destination will permit?

DECEMBER XIII.

THOUGHTS ON THE RAVAGES OF WINTER.

I hear the wind and the tempest roar. The blood freezes in my veins. The gathering gloom, the fearful misgivings of my heart, concur to render the awful tumult of nature more terrible. How often does the wind sweep down cottages and palaces, and in a moment destroy the labour of years! How often are ships, and the unfortunate men who hazard their lives in a brittle bark, plunged into the dread abyss! And how often are the sturdy oaks torn up by the roots! But thou, O Lord, art the creator and the ruler of the storm. The tempests and the winds are thy messengers, the heralds of thy power, and the ministers of thy will. They should lead us to fear and to adore thee. Didst thou not set limits to their destructive power, they continually, and in all places, would cause the same ravages; yet, thanks to that wisdom which stills the winds, the lowly cottage is still preserved, though unsheltered from the rude blast of the storm.

If the creation, and all mundane events, are the works and effects of infinite wisdom, how can the disorder, desolation, and destruction, occasioned by tempests, ever happen? Can almighty intelligence produce any thing but order? or can supreme goodness design any other end than what is good? Thus my thoughts wander, O man; but what art thou that thus interrogatest thy Creator? Shall man

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say unto his God, Why hast thou thus created me?' And because we cannot explain the mysteries of nature, shall we say that the works of Providence are defective? To judge of his works, and of the ends which he has proposed, would require an intelligence and wisdom equal to his own. It is, indeed, wonderful that we are capable of perceiving a part of the order which he has established, of embracing a part of the wise and immense plan which he has executed, and that, considering the darkness of our understanding, things are not still more confused than they are.

To make a whole of the materials which compose the visible world, where many superb phenomena are produced, so many beauties displayed, and the treasures of reason, virtue, and felicity, abundantly enjoyed by myriads of living creatures, is a work so vast and wonderful, that it could alone be effected by a Being all-powerful, wise, and good. The farther our researches penetrate into the works of nature, the more the goodness and wisdom, which has created all, and governs all, is manifested.

After these considerations, we shall form a different opinion respecting the ravages of winter. The tempests, the frost, and the snow, and all the phenomena peculiar to this season, which can be considered as disagreeable, are linked together in the eternal order of things; each having its season and appointed time, and all contributing to the general harmony of the universe. The wind that affrights the mariner upon the ocean drives water upon dry lands. The sulphurous vapours, salt, and other matters, carried by the wind from one country to another, revive the earth, and restore fertility to the fields, which have been exhausted by their frequent crops. Thus winter, apparently so destructive, enables our meadows again to yield us rich fruit. The fields, the gardens, and the seeds, now repose beneath ice and snow. All nature appears dead. But God, during this apparent suspension of vitality, preserves the world, and watches our suffering nature. He feeds and supports the poor, and even neglects not the starved shivering birds, for whom he provides places of retreat.

'Lord, thou art great! In the most tempestuous seasons thou art merciful and compassionate. From amid the ice and the snow thou preparest food for us; and thou enablest us to bear the severity of the cold. Thou clothest the naked; thou strengthenest the weak; they live and are prosperous. Teach us to know thee, and to acknowledge thee as our friend and benefactor. Cause thy goodness to kindle a holy rapture in our hearts; to breathe in us such love that we can feel kindness for our enemy, clothe him when naked, feed him when hungry, and wipe away his tears when in distress! When, for thy sake, the poor man shares his morsel with him who is destitute, condescend to reward his labour of love. While time shall endure, winter and summer, seedtime and harvest, shall succeed each other, and thy blessings shall cover thy creation.'

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DECEMBER XIV.

SAGACITY OF ANIMALS IN PROCURING SUSTENANCE FOR THE WINTER.

There are some animals which, during the harvest time, lay up stores for the winter, containing provisions for six months: thus appearing to foresee that a season would come, in which they could not obtain their accustomed food, and that, provident of the future, they know how to calculate the quantity of provisions that will suffice for both them and their families. Among insects, bees are almost the only species that lay up provisions for the winter. They use their wax with great economy, because they cannot gather any more when the season of flowers is passed, and when they have no other means of subsisting, and constructing their cells, than the stores they have previously secured. They have also the sagacity to collect another sort of matter, which is necessary to secure their hives from the effects of cold; and this is a sort of glue that they obtain from flowers and bitter plants, and with which they closely stop up every crevice in their hives. They waste nothing, observing the strictest economy, and what they do not at present want, they reserve for future occasions. We are even informed by those who have carefully observed their habits, that when in winter they uncover the cells that contain the honey, they lay by the wax which closed them for future use.

Among quadrupeds, the hamster and the fieldmouse lay up provisions for winter, and, during the time of harvest, convey a quantity of grain into their subterranean dwellings. Among birds, magpies and jays collect acorns during the autumn, and preserve them for the winter in hollow trees.

These provident cares of animals cannot be the result of reflection, for that supposes much more intelligence than they are capable of. They only think of the present, and of what affects their senses either agreeably or disagreeably; and if it happens that the present has any reference to the future, it is without design on their part, and without their having any knowledge of what they do. Indeed, it is difficult to imagine how foresight and reflection should enter into the instinct of these animals, since they have no idea of the vicissitude of the seasons and the nature of winter; and having no conception of the measure of time, they neither know when winter will arrive, nor how long it will continue. It would be equally absurd to attribute to them reason, ideas of the future, or any reflection upon the means of existence during the severity of the season, since they always act without any variation, and each species constantly follows the same method as its predecessors, without any instruction. When the bees, then, do not cease to collect wax and honey till they have filled their magazines, or until the season no longer permits them to work, it is not because they foresee that a time will come when they can collect no more: such a degree of foresight ought not to be attributed to them. They are instigated by nature to collect wax and honey, to work

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during the fine season, and by the time winter arrives they have generally filled their magazines. These, as well as all other animals, act without reflection or design, almost mechanically, although they seem to follow the wisest rules that could have been detected. Being, therefore, destitute of reason, that wise economy, and those apparent acts of foresight and reflection, which we observe in them, must be produced by a superior intelligence, which has thought and taken care for them, and whose views they fulfil without knowing it. And herein consists a part of the prerogatives which men enjoy over brutes. We can recall the past, and imagine the future, act from reflection, and form plans, determine from motives, and choose what is suitable. How important it is, then, that we should make a right use of these prerogatives! Informed as we are of the great revolutions that await us, and being able to anticipate the winter of our lives, how incumbent it is upon us to prepare a rich stock of knowledge and virtue, which, as we decline in the vale of years, shall smooth our path into eternity, and gild our last moments with the rays of joy and of peace!

DECEMBER XV.

ADVANTAGES OF WINTER.

It is advantageous frequently to reflect upon the blessings which God grants to us in this rigorous season. In consequence of the cold and frost, many noxious vapours are retained in the superior regions of the atmosphere, by which means the air is rendered more pure. Far from being prejudicial to the health of man, they often improve it, and counteract that debility which a continued heat would produce. If all the vapours and exhalations which are collected in the atmosphere were to descend in the form of rain, the earth would become too soft and wet, the roads would be impassable, and our bodies would be subjected to various diseases. In hot countries, and in those where there is much wet during the winter, dangerous and severe diseases are much more frequent than in other places. Travellers inform us that in Greenland, where mountains of ice are very common, and where in winter the days are scarcely four or five hours long, the air is very salubrious, pure, and light; and that, except some complaints in the chest and eyes, occasioned partly by the nature of their food, the diseases most common in Europe are rarely met with. And it is also certain, that the constitution of the human body varies according to the climate in which it is placed; so that the inhabitants of the northern countries enjoy a constitution adapted to the excessive cold that prevails there, and they are generally very robust and hardy. Even as man, though he loves to be in action, and that labour is necessary to him, is yet glad to have his toil interrupted by the recurrence of each evening, to taste the sweets of sleep, and to pass into a state altogether opposite to that in which he was when awake; so also

does our nature accommodate itself to the vicissitudes of the seasons, and we are are pleased with them, because they contribute to our happiness and well-being.

At present our fields and gardens are covered with snow, which is necessary to preserve them from being injured by the cold, to secure the seeds from the impetuosity of the winds, and to prevent their being destroyed. The fields, after having during the fine weather produced all the fruits upon which we live in the winter, require some repose. And in this we have great cause to acknowledge the wisdom and goodness of God; for if he had not provided for our support, and if to obtain our nourishment we were obliged to cultivate the earth in this rigorous season, our complaints might have some foundation; but he has began by filling our magazines, which are sufficient to supply all our wants, and permit us to enjoy a degree of repose suitable to the seasons.

How tender are the cares of Providence for us during the winter! He has given to men that industry of which they have so much need to fortify themselves against the attacks of cold and frost. Their inventive mind has made them find the means for procuring for themselves an artificial heat, by means of which they can enjoy in their own apartments a degree of warmth equal to that of summer. The cares of Providence are not less evident in the annual production of wood, and its astonishing multiplication, than in the fertility of our fields. Besides, we have many animals at our command, which are very useful in enabling us to support the severity of the season. The colder the country, the more useful are those animals whose furs are designed to keep us warm. And is it not evident that Divine wisdom has foreseen the wants incident to different climates, when he has placed in them animals that could live no where else?

Winter does not materially interrupt trade or commerce. For though the rivers may have lost their fluidity, their surface, solid as a rock, is converted into a high-road, where carriages may pass in safety. Though we are obliged to suspend the labours of the field, there are various other ways in which we may be usefully employed; and we are never condemned to a state of idleness and inaction. The repose of nature invites us to look for resources in our own minds; and though our imagination cannot now be warmed with the beauties of nature in their spring and summer robes, our mind no longer attracted by external charms, will be at leisure to look back, and dwell upon the images it has formerly perceived and made its own; or it may from the present change in nature be led to reflect upon the instability of all earthly things, and prepare to enter into that eternity to which it is hastening, and devote itself with full sincerity to the service of that Supreme Being who never changes, but is ever the same, merciful, just, and omnipotent.

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DECEMBER XVI.

THE ELEMENTS.

Whether we consider the universe collectively, or examine its different parts in particular, we shall always find sufficient cause to admire the wisdom and goodness of the Creator. It is true that we have a very imperfect knowledge of things, and that in most instances we can scarcely advance beyond conjecture and probability; but this is enough to make us acknowledge, on the one hand, the grandeur of God, and on the other, the weakness of our reason. Perhaps all the elements are of the same nature, and may be reduced to a single essence, so combined as to form but one whole. As it would be very difficult for us to consider the elements as a whole, it is necessary to divide them, and separately consider the primitive constituent parts of bodies.

How various and admirable are the properties of the air which we every moment respire! How great is the force with which it divides and dissolves all kinds of substances, at the same time imbibing their different qualities! Innumerable vapours and exhalations, thousands of various odours, volatile salts, alkalies and acids, oils and inflammable spirits, that all mix and unite with it, sometimes rendering it noxious, though generally salubrious and beneficial. These foreign particles contained in the air, its elasticity, the property that it has of becoming rarified or condensed, and of regaining its natural state, produce those agitations in the atmosphere, those meteors that disperse the noxious vapours, purify the air, and favour the vegetation of plants. And though the effects of the air are sometimes severe, they are, nevertheless, necessary to prevent the earth being converted into a desert. There are in this element, as in all the works of God, impenetrable mysteries. Who, for instance, can explain how the particles of air, being so subtile as entirely to escape our sight, are yet the means by which objects become visible to us? How wonderful is the equilibrium that obtains between the external air and that which is within our bodies! A balance upon which our health and even life depends! And how admirable is it, that the same element should be the medium by which sound, odours, and light are transmitted!

Water has some conformity with air, and its properties and effects are not less various and admirable. All the abundance and salubrity of the air, all the riches of the earth, and the heat of the fire, could not prevent our perishing if we wanted water. Of how many changes and combinations is it not susceptible! Who has given it the property of dilating, dividing, and rarefying to such a degree as to enable it to ascend in the atmosphere to the height of a league, float there, and form itself into fogs and clouds? Who has given it the power of penetrating into plants, of again passing out by their insensible pores, and of diffusing itself over our fields and valleys in the form of dew? How astonishing is the property it has of sometimes

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becoming lighter than air, though a given quantity of water is nine hundred times heavier than a similar quantity of air; of attaching itself to all kinds of bodies, of dissolving the most compact substances, and of even uniting with fire!

Of all the elements, we know the least of the nature of fire. It is too subtile for our eyes; though its virtues, properties, and effects, are sufficiently obvious. Whether the essence of fire consists only in motion, or in the fermentation of inflammable particles, or, what several experiments would seem to authorize us to suspect, that it is a simple matter, differing in its nature from all other corporeal things; it is certain that its prodigious abundance, its utility and wonderful effects, deserve all our attention. There is no body so cold that does not possess particles capable of ignition. The presence of fire is universal; it exists in the air which we respire, in the water that we drink, and in the earth upon which we live. It enters into the composition of all bodies; it passes through the minutest pores, unites itself closely to them, and moves with them from one place to another; and however covered and refined, it does not fail to discover itself. How forcibly it dilates the air which surrounds it, whilst the air itself renders the fire more active! It gives fluidity to the water, fertility to the earth, and health and life to man and animals.

Earth, when pure, is distinguished from all other bodies by its having neither taste nor smell, by being insoluble in water and spirits of wine, and by its friability. It at first appears to be very different from all the other elements, and yet has so much conformity with them, that some naturalists believe that water is nothing more than earth in a state of solution, and that earth is water in a condensed state. According to these, the water upon our globe is continually diminishing, and gradually forming compact substances, and that our planet formerly was only a fluid mass, and at a still more remote period only water.

All these different elements are essential to our existence and preservation; and whenever we reflect upon their wonderful properties, and the numerous and diversified effects which they produce, our admiration must be called forth. With how many properties, all differing from each other, has God endued his works! How many agents, in the heavens and upon the earth, are continually in motion for the preservation of the universe, and each individual in particular! What wonderful revolutions and phenomena are effected by the elements alone! It would be more easy to number all the works of God, than to calculate the multiplied forces which are in action! How great, then, is the power of that Being, in whose hand are all the elements, and all the different agents in nature; who directs them all to the greatest and most noble ends; unto whom be rendered honour, glory, and praise, for ever and ever!

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DECEMBER XVII.

INFLUENCE OF THE SUN UPON THE EARTH.

The sun is a very powerful agent in the system of this universe. He is the constant source of the light that is so abundantly diffused over our globe. This light of the sun is the most subtile fire: it penetrates all bodies, and, when it is in sufficient quantity, puts all their parts in motion, attenuates and decomposes them, dissolves those that are compact, rarefies those which are fluid, and adapts them to an infinity of motions. Is it not evident, then, that from these diversified effects of the sun upon bodies must depend most of the phenomena and revolutions of the globe? When the force of the sun's light increases, that is, when the rays fall less obliquely, and in greater quantity upon a given place, and when they continue each day to act longer, which is the case in summer, it must necessarily effect great changes, both in the atmosphere and upon the surface of the earth. And when the rays fall more obliquely, and consequently more feebly, and the days are shorter, and their action is less prolonged, as is the case in winter, how different are the changes observable in the atmosphere! How gradually we perceive the alterations, when, from the remote sign of Capricorn, the sun advances nearer to the equinoctial line, till by the time of spring, the days are equal to the nights! And what new phenomena are seen, when this luminous body returns in summer from the tropic of Cancer toward the line, till the days and nights again become equal in autumn, and the sun removes from our zenith!

It is chiefly on the distance of the sun from the earth that all the diversity observed in the vegetation of plants, and in the internal constitution of bodies in all climates and seasons, depends. Hence each climate and season has plants and animals that are peculiar to it, and the progress of vegetation is more or less rapid, and the productions of nature continue a longer or shorter space of time.

It is impossible, however, to describe or even point out all the various effects of the sun upon the earth. All the changes and revolutions of the globe are principally owing to the action of this luminary, because upon it chiefly depend the different degrees of heat and cold. And it requires but a slight share of attention to be convinced of the numerous and sensible effects of which the sun is the prime cause. At one time he rarefies, at another condenses, the air; one while raises vapours and fogs, at another precipitates them down in the form of rain, or different meteors. He causes the sap to rise in vegetables and trees, which makes the leaves and blossoms shoot, and ripens the fruit. He animates all nature, and is the source of that vivifying heat which gives to organized bodies their power of developing, of growth, and of perfecting themselves; there is no place where his influence is not felt; it penetrates the rocks and the mountains, and extends to the depth of the sea. This alone is sufficient to convince

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us of the power of our Creator; and if we consider with what art and wisdom God has drawn a multitude of great effects from one and the same instrument, and made use of the sun's heat to produce so many phenomena of nature, we should more and more clearly perceive the omniscience, nothing short of which could have effected so many wonders.

DECEMBER XVIII.

WINTER RAINS.

What a difference there is between the effects of the rains which now fall, accompanied with cold and dreariness, and those of the refreshing rains of summer! This change gives a sorrowful aspect to nature. The sun is veiled, and the whole heaven appears to be one vast cloud. We cannot see far; a gloomy obscurity hangs over us, and we are threatened by the gathering tempest. At length the heavy clouds break, and the earth is inundated; the air seems an inexhaustible reservoir of water; the rivers and brooks swell, and, overflowing their banks, sweep over the distant fields and meadows.

However disagreeable and unpleasant such weather may appear to us, we must still acknowledge that it is ultimately for our good. The earth, almost exhausted by its fruitfulness, requires a renovation of its strength; to accomplish which, it is not only necessary that it should repose, but also that it should be moistened. Rain waters and refreshes the dry land, soaks into it, and penetrates the lowest roots of plants. The dry leaves that cover the earth rot, and form an excellent manure. The abundant rains of winter fill the rivers, and supply the springs and fountains with water. Nature is never idle, but is continually working, though her activity is not always apparent. The clouds, by continually pouring down snow or rain, prepare the fertility of the ensuing year, and the riches of summer; and when the heat of the sun brings back the dry season, the abundant springs which the winter rains had formed diffuse their waters, irrigate the meadows and the valleys, and adorn them with new verdure.

Thus the wise Creator provides for the future, and that which appeared to us destructive and inconvenient, becomes the source of all the beauties and riches which in spring and summer are lavished in such profusion. The gifts that we thus receive are more innumerable than the drops of rain that fall from the clouds; and at the very time when man, ignorant and blind, is murmuring and complaining, he ought to be singing songs of joy, for eternal immutable wisdom is then continuing to fulfil its beneficent designs. Our preservation, then, is the principal end that God purposes in sending rain upon the earth; and the divine wisdom knows how to combine various designs together, and from the happy combination results the order and harmony of the universe

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As the earth is benefited by the visitation of the tempest, and prepared for fertility by the repose and gloom of winter, so is man improved by adversity. To bring forth good works, it is not meet that the sun of prosperity should always bless us with his rays. From the nature of our constitution, and the design of our being, we must suffer trials, and occasionally experience disappointment and affliction. Let us, then, receive adversity from the hand of God with resignation, under the firm conviction that all his dispensations are ordered by unerring wisdom and infinite goodness.

DECEMBER XIX.

SUPPOSED INFLUENCE OF THE PLANETS AND FIXED STARS.

The prodigious distance of the heavenly bodies, and the little connexion that our globe has with them, scarcely renders it probable that they should have much influence upon it; yet many superstitious people believe in such an influence, and affirm, that there are continual emanations passing from the stars and planets that act upon our atmosphere and terrestrial bodies. But what are these emanations? If by them is meant the proper light of the stars, or the light of the sun reflected from the planets, that will be found to be very little, much less than what proceeds from the moon alone. And as the light that we receive from the moon has no sensible influence upon the earth, or upon the atmosphere, surely that which we receive from the planets and fixed stars, at a distance so much greater, cannot affect our globe. And the supposition that other matters emanating from these stars affect us is equally void of foundation; for if these emanations were really to take place, upon being collected in the focus of a burning-glass, they would produce some evident change in terrestrial bodies; but this is contradicted by experience. It seems, then, that nothing is emitted from the heavenly bodies but the light which they send us; or if any other emanations do proceed from them, they must be of such a nature as to pass through terrestrial bodies without effecting in them any sensible change, or the least derangement in their particles. Thus those astrologers, who either deceive themselves or wish to impose upon others, deserve the utmost contempt, when they tell us of the benign influence of Jupiter, the malignancy of Saturn, the wit-inspiring Mercury, the war-rousing Mars, and the amorous influence of Venus.

Planets not only cannot singly produce the peculiar effects that astrologers attribute to them, but even taken collectively cannot have any influence. What shall we say of the rain-bringing Pleiades, the stormy Orion, the melancholy Hyades, the setting of Arcturus, and the rising of Capricorn, portending hail and tempests? What influence can the constellation Taurus have upon peas and beans, and that of the star Sirius upon mad dogs? Or what relation can Scorpio

have with the harvests and produce of the fields? If the rising and setting of the different constellations were observed only as they denote the proper period for the different labours of agriculture, and not as the causes of natural things, it would be excusable. In the first ages of the world, the beginning, middle, and end of each season was not marked by the names of months, but by the rising and setting of the stars in conjunction with the sun, or by their immersion in and emersion from his rays. Hence the vulgar opinion, that the different aspects of these stars produced effects that in reality should be attributed to the seasons, and of course to the sun. Orion rises in autumn, and sets in winter: hence he is said to occasion tempests. When the dog-star rises with the sun it is extremely hot in our zone; but this constellation is not the cause of the heat, which is occasioned by the sun being then at its greatest elevation; and in the opposite zone, when the dog-star rises with the sun, it is altogether as cold: so that the inhabitants of the southern countries, far from considering the dog-star as the cause of heat, regard it as the cause of cold. The same may be said of the Pleiades, which are supposed to bring rain, and of all the constellations to which effects are attributed that really belong to the seasons in which these stars rise or set.

If, then, the planets and fixed stars have no part in the temperature and natural dispositions of our globe, they must still have less influence upon human actions. The happiness and the misery of individuals, and of whole nations, partly depend upon their natural talents and passions, and in part upon the political constitution of states, and upon the combination of certain natural and moral causes: consequently, the stars can have no influence whatever upon these, and if they had, we should have some reason to doubt the empire of Providence, and to disbelieve in the agency of a Being infinitely wise, good, powerful, and just. Leaving, then, to the superstitious a science so inimical to our repose, and so humiliating to the human mind; a jargonistic cant, disgracing the name of science, called by its advocates judicial astrology, and which in fact is nothing more than a miserable abuse of astronomy in the hands of knaves and of impostors, or of weak and foolish people; let us look up to our wise and merciful Parent as the only true foundation on which to rest the certainty of our present peace and eternal happiness.

DECEMBER XX.

THE POLAR STAR.

The most remarkable among the northern constellations is that which is nearest to the north pole, and termed the little bear. The last star of its tail is but two degrees from the pole; hence it is called the polar star. It is easily distinguished from the neighbouring stars, because it scarcely appears to change its position, and is always in the

same part of the heavens; for though it revolves round the pole, its motion is so slow, and the circle that it describes so small, as to be scarcely perceptible. By this apparent fixity of situation, it becomes a guide to travellers, and particularly to mariners who are sailing on the open seas. Before the discovery of the compass, sailors had no surer guide than the polar star; and even now, when the sky is serene, they repose in many cases with greater certainty upon the direction of this star than upon the magnetic needle.

The advantages which we derive from the polar star naturally lead us to the consideration of that moral guide and inestimable gift that God has bestowed upon us, his blessed word, and particularly the Gospel, which points out to us with unerring certainty the path that we ought to follow, and the true course in which to steer upon life's stormy ocean, through the gloom that darkens our way. Without such a faithful guide we should wander in uncertainty, and never find the path that leads to God and celestial glory. In the divine relation alone do we find a certain and invariable rule, by which we may pursue, with courage and assiduity, the race that is set before us, and accomplish it with joy and felicity.

Let us attend to this, as the pilot attends to the polar star, and, by continually keeping it in sight, prevent the possibility of erring. With this heavenly guide we shall shun all dangers, be preserved from shipwreck, and after our long and arduous voyage, at length happily arrive in that blessed haven where we shall rest from all our labours, and enjoy a happiness which nothing can molest or disturb.

The preceding reflection on the polar star is also calculated to make us admire the goodness of God, who, by the position and the course of the stars, has given us the means of knowing the times, places, and different points of the heavens. An astronomer, though in an unknown country, can, by means of the stars, know where he is; and can inform himself of the month, the day, and the hour, with the same certainty as if he had consulted the most correct timepiece. If, for instance, we observe that the stars every day are seen four minutes sooner at the place where they were on the preceding evening, we know that in a month it will amount to two hours. Thus the star that we see this evening, the 20th of December, at ten o'clock, in a certain part of the heavens, will be seen on the 20th of January exactly in the same place at eight o'clock.

DECEMBER XXI.

EFFECTS OF AIR WHEN CONFINED IN BODIES.

The effects of air, enclosed in bodies, are very remarkable. The consequence of fluids freezing is well known. Water, in the act of congelation, often bursts the vessels which contain it. The barrel of a gun, filled with water, its entrance being hermetically sealed, when

the cold is severe, bursts with great violence. At first this appears to be incomprehensible; we know that water is not of itself fluid, but becomes so by the caloric which every where pervades it, and consequently, when deprived of the matter of heat which it contains, becomes a solid mass. It should seem, then, that in their state of congelation, the particles of water must be condensed, and approach nearer to each other, and thus occupy less space than before they were frozen. On the contrary, at the time of freezing they dilate, and their volume increases, otherwise it would be impossible for the vessels to burst. Besides, how could ice swim, if it did not form a greater volume, and become lighter than when in a state of water?

What, then, is the cause of this singular effect? Internal air; for it is impossible to suppose any external cause. To be convinced that it is owing to the air contained in the water, we have only to observe that fluid when it first begins to freeze. Scarcely is the first pellicle of ice formed when the water becomes agitated, and a number of air bubbles ascend. This upper coat of ice often rises in the middle and splits; the water springs up through the cleft, dashes against the sides of the vessel, and in running down again is frozen; thus giving the appearance of elevation and convexity to the middle of the surface. These effects are produced by the air contained in the water, and would not take place, or at least would appear in a much less degree, if, before the water began to freeze, it was exhausted as much as possible of the air which it contained.

On this principle we may explain many singular phenomena. A severe cold is very injurious to vegetables. We know that in all plants the sap circulates; which, though it becomes rather more viscous in winter and in autumn, nevertheless continues fluid. An intense degree of cold converts it into ice, and then evidently increases its volume, which cannot take place without causing several fibres and stalks of plants to burst. When this is the case, it is clear that when the sap becomes rarefied in spring, it cannot circulate as it ought to do, no more than the circulation of the blood can be carried on in an animal whose veins are cut. Thus the growth of the plant is prevented, and it dies, because the nourishing juice can no longer flow through its vessels.

From all this we may be convinced of the power of the air, and of that expansibility from which we derive so many advantages. The property that this element has of condensation and of rarefaction, to an almost incredible extent, is the cause of the greatest revolutions that happen upon the earth. It is only in a very few instances that the power of this fluid can become injurious, and then the evils which result are amply compensated by the advantages. We must, however, confess that in this, as in every other phenomenon of nature, there are many things which we are unable to explain: great part of our knowledge of the nature, properties, and effects of air is conjectural, and perhaps it is reserved for succeeding generations to prove how false and erroneous our opinions upon this and many other subjects have been. Whenever, therefore, we contemplate the works of God in

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nature, let us examine them with caution, and investigate them with a mind humble, conscious of its own inefficacy, and ever mindful of the limited extent of our understanding, and the uncertainty of human judgment or opinions.

DECEMBER XXII.

MUSIC.

To music we are indebted for one of the purest and most refined pleasures that the bounty of heaven has permitted to cheer the heart of man. As it softly steals upon our ear, it lulls to rest all the passions that invade our bosom, arrests our roving fancy, or in louder strains excites the soul to rage. Often, when wrapped in melancholy, the sweet voice of music charms away our cares, and restores our drooping spirits, or awakens in us the sentiments of honour and of glory. And surely that which can assuage our griefs, pour balm into our perturbed breasts, and make us forget our sorrows, is deserving of consideration, and should be made use of to glorify our beneficent Creator.

Whence proceeds the impression that music makes upon the ear? It is the effect of certain undulations of the air, which strike diversely upon the auditory nerve. When a light cord is pulled, its figure changes; for from its elasticity it not only regains its first situation, but advances beyond it, and continues vibrating backwards and forwards until it recovers its original position and state of rest. These vibrations of the cord are communicated to the air, which conveys them to other contiguous bodies. Thus, when an organ is played upon, if a lute be near, its strings will be put in motion, and make a sound. But whence proceed the variation of sounds, and how is it that some are sharp, others flat? This is not owing to the quantity of air that is put in motion; for a sound may be flat or sharp, and at the same time strong or feeble. The differences of flats and sharps depend upon the greater or less rapidity of the vibrations of the air. A sonorous body emits a sharp tone when the vibrations are very quick, and a flat when they are more slow. Whence is it that certain sounds are harmonious, and charm the ear, whilst others offend by their discord? All that we can reply to this is, that the natural character of consonances consists in being in the same key; whereas in dissonance, the notes, though struck at the same time, do not accord, but produce a grating on the ear that is extremely unpleasant. Let us, then, be grateful to the God of all love and mercy for the raptures that we enjoy from the impressions of sound pouring music through our souls; and raise one general song of joy, to celebrate his praises, that shall ascend into heaven, where the blessed angels of light will join in the full chorus of pure and heavenly harmony.

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DECEMBER XXIII.

MEN COMPARED WITH OTHER ANIMALS.

In the comparison which we are about to draw between men and other animals, some things will be found which are common to both; others in which brutes will have the advantage over us; and others again where man will possess a decided superiority over them.

The principal resemblance between men and brutes is, that they are both material. Like them, we have life and organized bodies, which are produced by generation and birth, and supported by food. Both have strength and animal spirits to enable them to fulfil the different functions that are assigned them; both have voluntary motions, the free exercise of their limbs, senses, sensations, imagination, and memory. By means of the senses, both experience the sensations of pleasure and of pain, which cause them to desire certain things and reject others; both have a natural propensity for self-preservation, and the propagation of their species; and both are subject to those general corporeal accidents that the catenation and different relations of things, the laws of motion, the structure and organization of their bodies, must occasion.

With regard to the pleasure that results from sensual gratifications, brutes have several advantages over men. A very principal one is, that they do not require the clothing, instruments of defence, and conveniencies, which men do, and which they are obliged to invent themselves, or to learn and to exercise the arts that are necessary to procure them. Animals bring with them into the world all that they require; or if any thing be still wanting, to obtain it they have only to follow the instinct which they have received from nature, and which never deceives them: it always conducts them in safety; and as soon as their appetites are satisfied they are perfectly content, and desire nothing farther; and they enjoy the present without being concerned for the future.

In these respects, brutes are superior to men. Man is obliged to meditate, invent, labour, exercise himself, and receive instructions, without which he would remain as in a state of childhood, and would with difficulty obtain the necessaries of life. His passions, so far from guiding him, tend to lead him astray. It is reason alone that constitutes the great and essential difference between him and brutes, indicates to him the means of satisfying his wants, and gives him prerogatives to which the brute creation can never attain. Gifted with the faculty of reason, man is enabled to procure every necessary, every convenience, and every luxury; to multiply all his pleasures, to ennoble and render them subservient to the best purposes. His soul enjoys delights that are unknown to brute animals; pleasures whose sources are knowledge, wisdom, religion, order, and virtue, and which infinitely surpass all merely sensual gratifications, inasmuch as they tend to improve and promote the perfection of human

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nature, causing it more and more to resemble the divine essence of God; and they endure for ever; whilst, on the contrary, the more a man indulges in sensual gratifications, the more does he become unfitted for any thing great and dignified, and approaches nearer to the nature of brutes.

We may also add, that the sphere in which animals are obliged to move is very narrow and confined; their desires and propensities are few, and their pleasures little diversified; while those of man are infinitely varied; he is interested in all objects, and there is nothing which he cannot convert to his utility. He is the only being upon the earth that is progressively advancing towards perfection, continually making new discoveries, and enlarging his stores of knowledge; all other animals remaining constantly confined within a limited circle, neither capable of invention, nor able to attain to greater perfection; always continuing at the same point, unable by application and exertion to rise above other animals of the same species.

Reason, then, and its consequences, alone give us that decided superiority which we enjoy over the brute creation; and in it consists the chief excellence of our nature. To make use of reason, to ennoble the pleasures of the senses, to increasingly enjoy intellectual delights, to progressively advance in wisdom and in virtue, is the distinguishing characteristic of man; the great end for which he was created, and the chief object to which he should direct his attention.

DECEMBER XXIV.

CALCULATION CONCERNING THE RESURRECTION.

How numerous will be the crowd of human beings assembled together in the great day of the resurrection! Supposing that Germany did not begin to be peopled till five hundred years after the general deluge, that is, about four thousand five hundred years ago; and that from the foundation of the city of Hamburgh at the above time, to the day of judgment, supposing that it was to happen at the present epoch, there have only been two hundred persons buried annually, reckoning one year with another; the number of deaths would amount to nine hundred thousand. If, then, a single city should produce so many human beings at the day of judgment, how many must the whole empire of Germany supply in the same space of time? Supposing that it contains twenty-four millions of inhabitants, the city of Hamburgh could not be estimated at more than the three-thousandth part of the whole.

If that is the case, we may suppose, on the preceding calculation, that Germany alone would produce two thousand one hundred millions. The number is doubtless very great; and yet what is it compared with the produce of the whole earth, the present number of whose inhabitants is estimated at about one thousand millions? If we

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take this number, and make use of the same calculation as before, the sum total of deaths in the above-mentioned period of time will amount to eighty-seven thousand five hundred millions. And if now be added those that have lived before the deluge, and those who died during the next five hundred years, which may be reckoned at a fourth part of the preceding, we shall then have a total of one hundred and nine thousand three hundred and seventy-five millions. And lastly, let us add the number of people that will be alive at the day of judgment, which, estimating it at our former calculation of one thousand millions, will give a total of one hundred and ten thousand three hundred and seventy-five millions.

How inconceivable, then, must that intelligence be, which can scrutinize the most secret thoughts of each individual of which such an infinite multitude is composed! an intelligence that scans every hidden sentiment, word, and deed; which exactly remembers the hour of their birth, the duration of their life, the manner and circumstances of their death; and which knows how to distinguish the scattered atoms of each, and collect them together, whether their bodies had been reduced to ashes, dissolved into millions of particles, or undergone innumerable transformations. How omnipotent is the work of collecting these scattered particles, of purifying and ennobling them, and forming them into new, immortal, and incorruptible bodies!

We are informed by divine revelation that hosts of angels shall gather the chosen from the four winds; that the sound of the trumpet shall awaken the bodies of the saints that sleep. How delightful to the ten thousand times ten thousand thousand angels will be the office of collecting their beloved brethren, and presenting them to Christ! How transporting for the myriads of blessed spirits whom God had gathered in his bosom, again to receive the bodies which they had left, pale, emaciated, and disfigured by sufferings, torn and mutilated by violence, or consumed by fire; to receive them back, clothed with celestial beauty and splendour; light and radiant as the forms of the holy angels!

DECEMBER XXV.

THOUGHTS UPON THE NATIVITY OF CHRIST.

What sentiments of joy and gratitude should the Christian feel on this day, when he celebrates the birth of Jesus! How great is my wonder when I meditate upon the circumstances which attended that glorious event! I represent to myself the Son of God in the lowest state of humiliation, clothed with a corporeal being, visible and weak as I am. How wonderful! The Son of the King of kings, whom angels minister unto and adore, appears a feeble babe, naked, destitute, and shedding tears, lying in a manger! How prodigious the change from this humiliating and limited state of being to be elevated,

the Saviour of mankind, upon the throne of eternal glory! When I reflect upon my own unworthiness, and the infinite majesty of Him who offered himself up a sacrifice to human malice and suffered every indignity that the ingenuity of men could devise, to be my Mediator and Redeemer, I feel my admiration and astonishment too great for utterance; and when I discover such a love as infinitely surpasses what the best of men can possibly merit, a love beyond all my powers of conception or hope, I am lost in astonishment, and can only silently admire and adore.

DECEMBER XXVI.

THE PLACE OF OUR SAVIOUR'S NATIVITY.

To many individuals, at first sight, it may appear to be of little consequence to know the place of Christ's nativity; for we should regard him as our Redeemer, whatever may have been the circumstances which attended his mortal life. But as it pleased God to declare the place in which the Saviour of man should be born, it became necessary that it should happen precisely in the appointed place, that it might be one of the characteristics by which Jesus Christ should be known to be the true Messiah.

It is also very immaterial to us where we may live, provided that we find true happiness. There is no place upon the earth, however poor and despicable, that may not have better and more happy inhabitants than are found in the largest and most celebrated cities. Do we know a single spot upon the globe where the works of God do not present themselves under a thousand different forms, and where a person may not experience the sweet consolation arising from a well spent life? For an individual, that place is to be preferred where he can receive and communicate the most good. For a number of people, that place is the best which contains the greatest proportion of wise and good men. Every nation declines in proportion as religion and virtue lose their influence over the minds of the people. The place where in our youth we contemplated the opening of the morn, and the renewed beauty of nature, with all the raptures incident to that age, whilst we adored our God with all the veneration and love which we felt so warmly in our hearts; the place sacred to our first effusions of pure and inviolable attachment to the object that we loved, or where two friends have pledged their mutual affection; the place where we have received the first rudiments of knowledge, or acquired the great principles of religion, and become examples of goodness and purity; ought to be very dear to us, and closely wound round the tendrils of our hearts.

According to these principles, Bethlehem, notwithstanding its smallness, was a venerable place, since it was the abode of so many pious people, and that singular acts of piety and devotion had been

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practised there. It was there the patriarch Jacob stayed some time to erect a monument to his much-loved Rachel. It was at Bethlehem that Naomi and her amiable daughter-in-law, Ruth, gave striking proofs of their faith and their virtue; and it was there that Boaz, the generous benefactor, had his abode and possessions. At Bethlehem sojourned the humble Jesse, the happy father of so many sons; the youngest of whom ascended from the pastoral hook to the sceptre of Israel. It was there that David formed the resolution of building a house to the Lord, and showed himself the true shepherd and father of his people, when, at the sight of the exterminating angel, whose sword carried with it death and dismay, he interceded for the afflicted sufferers. At Bethlehem was born the Prince Zerubabel, the descendant of David, who was the type of that Ruler and Shepherd, under whose banners Israel was one day to assemble, in order to enjoy uninterrupted felicity. Lastly, in this city appeared the Son of God, who, by his birth, laid the foundation of that salvation which, as Redeemer, he purchased for the whole world. Thus in a place of contemptible size, and mean appearance, we sometimes see men spring up, who become the fathers and benefactors of the human race. And often a village unknown to fame has given birth to a man who, by his wisdom, uprightness, or heroism, has been a blessing to whole kingdoms.

It is our duty, whether our lot be cast in towns, in hamlets, or in cities, so to live, that the end for which our Saviour was born may be accomplished in us. It is certain that true piety would make much more rapid progress upon the earth, if men every where endeavoured to give proofs of the innocence of their manners and the fervency of their faith, and become examples of patience, diligence, and uprightness. If our cities presented more patterns of virtue, their influence might extend to the inhabitants of the country; so that every village and hamlet might contain families who, like Joseph and Mary, distinguished themselves by their devotion, and obtained respect and esteem for their piety, though dwelling in poverty and obscurity. God would scatter his blessings over the country of these good people, and after some generations we might reasonably expect that a people would be formed full of the fear of the Lord, and walking carefully in his ways. He who has traversed the extent of the globe, has visited cities, and the splendid domains of royalty, and has witnessed all the diversified species of iniquity, and crimes of every hue that are there practised, has abundant cause to be thankful to God when at last he finds some town or village where, in a peaceful cottage, and surrounded by his family and friends, he may devote himself entirely to the service of God and the benefit of his fellow-creatures; and thus attain that sweet content and heavenly peace of mind, which alone can be the result of good actions and an innocent heart. He will not then regret those places that he has once seen; more splendid, indeed, but where sensual pleasure spreads all its snares; more vast and grand, but where vice is triumphant; more rich, but where the people live in the forgetfulness and in the neglect of the duties which they owe

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to God and to man. To all these he will prefer an obscure retreat, where, safe from the pangs of remorse, and the upbraidings of a conscience ill at rest, he may spend his days in peace and in joy.

DECEMBER XXVII.

CARE WHICH GOD TAKES OF MEN FROM THE TIME OF THEIR BIRTH.

The wants of our infancy are numerous. With pain and difficulty we come into the world; and should soon lose the life we had but just begun to feel, if the various things necessary for our food and clothing were not prepared beforehand, and if there were not persons to take care of us in our weak and helpless state, when we are destitute of all things; or, rather, if our heavenly Father himself did not watch over us for our preservation. He took care of us whilst we were in our mother's womb, at a time when no human wisdom or industry could assist us. It is he who fashioned our bodies, and arranged and connected together all their various parts. He has given to each of the veins its particular direction, and pours through them all the vital fluid. He has clothed us with skin and with flesh, and has given us bones and nerves; and by diffusing through all these an intelligent and rational spirit, has formed a being worthy of bearing his own divine semblance. The same Providence which watched over us at the time of our first being has graciously continued his paternal cares, and has never forgotten us. And he is not merely satisfied with providing for all our necessities, by giving us fond and affectionate parents, who, whilst we are unable to do any thing for ourselves, tenderly cherish and preserve us as their greatest blessing and delight; but he has done more, he has laid the foundation of our future happiness. At the time of our birth the causes which would influence our future welfare already existed, and began to operate according to the views of a wise Providence. How much the comforts or the misery of our lives depend upon our parents; their opinions, ranks, fortunes, and connexions! How much the happiness of our lives must be influenced by our early education, the examples that are before us, the connexions that we form, the opportunities that occur of exercising our powers, and developing our faculties! And is it not God, our Father, whose wisdom and goodness ordered all these things for our present and eternal happiness? How consoling, then, is the thought, that a Being infinitely good, wise, and powerful, has watched over us before we were born, guarded our tender infancy, and determined and regulated all that we shall require in the course of our lives.

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DECEMBER XXVIII.

PERIOD OF HUMAN LIFE.

Every man dies precisely at the time that God, in his eternal wisdom, has appointed: as the time of our birth is fixed, so also is that of our death. But the term of life is not subjected to an inevitable fatality or necessity; such things do not exist. Every thing that occurs may happen sooner or later, or not at all; and the man who died to-day might have died sooner, or lived longer. God has not numbered the days of any particular individual by an absolute and arbitrary decree, or without having a regard to the circumstances in which the individual may be placed. God, being infinitely wise, can do nothing without motives that are worthy of his divine nature. He must, then, have just reasons for determining that such a man should leave the world at one time rather than at another. Yet, though the term of life be in itself neither affected by necessity nor fatality, it is certain, and can never be really changed.

Whenever a man dies, some causes must infallibly lead to his death: these, however, may at any time be suspended by the Supreme Being. One man dies of some mortal disease, another by a sudden and unforeseen accident. One perishes by fire, another by water. All these causes God has foreseen: neither has he been an idle or an indifferent spectator; he has examined them all with care, compared them with his views, and has seen whether he will approve of them or not. If he approves of them, they are determined; and, in that case, there exists a divine decree, by virtue of which a man will die at a certain time by some particular accident or contingency. This decree can neither be revoked nor prevented; for the same reasons which might influence God to take a man from the earth at this present time were known to him from all eternity, and his wisdom would enable him to form the same judgment then that he would in the present instance. What, then, should induce him to revoke his decrees?

It may, however, happen that God, foreseeing the causes of the death of a particular individual, did not approve of them. In this case he has at least determined to permit them, or otherwise they could not have taken place, nor the individual have died. And if the permission of these causes of death has been determined, God then wills that we should die in the time when these causes shall exist. It is true he might have been disposed to grant us a longer life, and not approve of the causes of our death; but it was inconsistent with his wisdom to counteract their operation. He saw the universe collectively, and found reasons which induced him to permit that a man should die at a particular time, though he neither approved of the causes, manner, nor circumstances, of that death. His wisdom finds means to direct that death to the most useful purposes; or he foresaw that a longer life, in the particular circumstances in which a man was placed, could neither be of advantage to him, nor to the

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world in general: or he saw, that to prevent that death, a new and perfectly different combination of things was requisite; a combination that could not accord with the general plan of the universe, and which would prevent still greater good from taking place. Thus, although God may sometimes disapprove the causes of a man's death, he has, nevertheless, sufficiently wise and just reasons to permit them to take place; and consequently, to determine that a man shall die at a particular time, and by certain means. These considerations are well calculated to make us regard death with christian resignation and fortitude. What principally renders it so formidable is the uncertainty of its approach, and the manner in which it seizes us. If we knew beforehand how and when we should die, we might prepare to meet the awful hour with resolution. But as that is very seldom the case, nothing is more effectual to strengthen our minds and tranquillize our thoughts upon that event, than the belief in a Providence which watches over our lives; and which, from before the foundation of the world has determined, with infinite wisdom and goodness, the time, the manner, and all the circumstances of our death. The term of our lives is then appointed; and nobody can die sooner or later than God, in his infinite mercy, has determined for the good even of the individual himself. Persuaded of this consoling truth, let us calmly await the hour of death: and since its arrival is uncertain, let us be wise enough to prepare for it at all times, and be found in a state of readiness whenever it may happen; knowing that the period will be that which God has judged will be the best for us. It is true, we are ignorant what will be the manner of our death, and the particular circumstances attending it; but it is sufficient to know and to believe that we can only die in that way, and at that time, which our heavenly Father shall deem to be the best for ourselves, and for all those connected with us. Strengthened by this belief, we shall continue to pursue our terrestrial pilgrimage without inquietude; submitting patiently to all the dispensations of Providence, fearless of the dangers to which the performance of our duty may expose us.

DECEMBER XXIX.

THE INSTABILITY OF EARTHLY THINGS.

Nothing exists in nature whose state and manner of being is not liable to change. Every thing is the sport of frailty and inconstancy; nothing is so durable as always to retain its present appearance. The most solid and compact bodies have not such a degree of impenetrability, and so close a union of the parts which compose them, as to be exempted from dissolution and destruction. Every particle of matter insensibly changes its figure. How many changes have our bodies undergone since their first formation in our mother's womb! every year we lose some of our constituent parts, and again acquire new ones.

Every thing upon the earth grows and decays by turns, only in some bodies these changes are not so frequent and great as in others. The heavenly bodies appear to be the same as they were at their first creation; and perhaps they are the least changeable of all bodies. Yet attentive observers have noted the disappearance of certain stars from the heavens; and the changes which take place in the spots that appear on the sun prove that he is not always in the same state. Besides, his motion subjects him to different variations, and we have reason to believe he undergoes at times various internal revolutions. All that we can know of them is conjectural, because of the immense distance that we are from him; and, no doubt, if we were able to observe them near enough, we should discover as much instability in all the heavenly bodies as we do upon our earth.

The year, which in two days more will terminate, furnishes abundant proof of the uncertainty and frailty of all earthly things. Confining ourselves to the small circle in which we move, how frequent are the changes that we witness! Many of those people whom we have known for years are no more; many whom we have seen smiled upon by fortune are now grovelling in poverty, or reduced from a state of rank and influence to mediocrity and dependence. If we examine into ourselves, we shall also find we have undergone various changes. Our health and activity may have decayed; we may have been subjected to misfortunes, sickness, and the infidelity of those whom we trusted.

Such reflections are gloomy and sorrowful, and might even reduce us to despair, if we were not supported and consoled by religion, which leads us to an almighty, unchangeable, and eternal Being; in the full assurance of whose unalterable goodness and love, let us submit with resignation to all the vicissitudes of this transitory world.

DECEMBER XXX.

RETROSPECT OF OUR LIVES.

The termination of another year of our lives should induce us to make some reflections, which, though of the utmost importance, do not in general occupy so much of our attention as they ought. That we may feel more sensibly how short is the period of our lives, let us examine how we have passed the days that we have already lived, however humiliating a task it may be.

Let us first consider those days, the employment of which it was not in our power to regulate. How much of this year has been passed in eating, drinking, and sleeping; in taking care of our bodies, and providing for our necessities? How much time has been spent in useless occupations, without any advantage gained for our immortal souls! How many hours have been passed in uncertainty and inaction; in perplexity, and in expectation! So that when we make the

days of the year pass in review before us, we shall discover how numerous those have been that were unproductive of any intellectual good; and how very few have been employed in acts of real utility, either to ourselves or to others; and of those few, how many hours have been sacrificed to vice, and devoted to sin! How humiliating and afflicting is the recollection that so many of the hours allotted to us by almighty Goodness have been lost in idleness, or lavished in folly: hours that never can be recalled; in which we have wandered far from the best and tenderest of Fathers! Perhaps they have been profaned by impiety, envy, jealousy, and slander; or sacrificed to the world, to vanity, to indolence, and to false pleasures; all tending to divest our hearts of the love of God, and charity for one another. Instead of employing them in the promotion of righteousness, perhaps we have devoted them to oppose the cause of truth, and combat the designs of Providence; giving trouble to society, and molestation to the church. And, lastly, how rapidly does the short space that we have to remain upon the earth fly away! Year after year passes by almost imperceptibly, before we even notice it; and then it is impossible to be brought back.

Father of mercy! forgive us the faults we have had the misfortune to commit; and grant that in the awful hour of death the manner in which we have passed our last year may not cause anguish to prey upon our hearts.

DECEMBER XXXI.

HYMN OF THANKSGIVING FOR THE CLOSE OF THE YEAR.

Lord, thou art the God of time: thou art also the God of eternity! I will sing a joyous song to thy praise; I will celebrate thy holy name. A year is about to finish its course: to what do I owe the continuation of my existence? It is to thy grace alone, and to thy paternal love!

Being of beings, receive my adoration! Thou art immutable: thou hast been, thou art, and thou shalt be through all eternity! Thy love endures from generation to generation; and each morning brings a renewal of thy goodness!

Thou hast led me by thy paternal care through the year that is now ending: when my heart was preyed upon by care and sorrow, thou visitedst it by thy consolation and assistance, I will praise thee and exalt thee from the depths of my soul, and again commit myself to thy wise and unerring guidance.

Pardon, O my God, those innumerable errors which I have committed against thee in the days that are passed; and let me again experience, for Jesus Christ's sake, thy paternal support. Teach me to do thy will and thy pleasure all the days of my life!

The world passes away, and its pleasures disperse: it is not in

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these, therefore, that I am to seek my happiness. Even here below I may aspire to nobler joys. I am allied to angels, and heaven is my patrimony :—Grant, O God, that I may incessantly aspire after it!

Teach me, O God, to redeem my time, and to walk with holy circumspection in the way that leads to eternity! Condescend to alleviate the burden of life, till I attain the happy period when all my labours shall cease, my repose no more be interrupted, and when I shall enter into the eternal kingdom of joy and peace!

AMEN.

THE END.

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